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Environmental Impact Assessment Report

Volume 2 – EIAR

Prepared by: AWN Consulting, August 2025

Prepared for: Crag Rathnew DC Limited and Kent Homes Limited

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Chapter 1 – Introduction

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1. INTRODUCTION TO THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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1.1 Introduction

This chapter of the EIAR introduces the Proposed Development, summarises the Environmental Impact Assessment (EIA) process, and provides an overview of the methodology used for preparing the EIAR. Details of the competency of the EIAR authors, the consultation undertaken, as well as details of any additional environmental related reports and/or assessments that are required under Legalisation or EU Directives other than the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU) are herein outlined.

This Environmental Impact Assessment Report (EIAR) has been prepared in respect of the Proposed Development (the Masterplan) which comprises a number of distinct but connected areas; a new village centre, a solar farm and rewilding area, battery storage, and a data centre with associated energy centre. The applicant for the Proposed Development is Crag Rathnew DC Limited and Kent Homes Limited (hereinafter referred as 'the Applicant').

The Proposed Development is c. 108.64 hectares, of which c. 26.7 hectares is the proposed Technology Park and Village Centre, and the remainder is the proposed Solar Panel Farm, and is located to the southwest of the R680, and the village of Kilmeaden which lies along Regerthis road. The Proposed Development site is located c. 8km to the west of Waterford city and c. 10km north of Tramore town. The site is located in the townlands of Ballyduff east, Amberhill and Blackknock, Co. Waterford. The Whelanbridge River bounds the site to the west and the Whelanbridge Tributary bounds to the east. To the north and south of the site lie agricultural lands with scattered rural residential dwellings. Kilmeaden village lies to the northeast.

The lands have an established history of industrial use, as Kilmeaden Cheese Factory operated on site for c 41 years. The plant closed in 2005 and was subsequently demolished to make the site suitable for future development. The application lands are subject to a Specific Objective under the Waterford City & County Development Plan (KLMDO1) to facilitate and encourage the development of new industrial/enterprise/employment uses on this site which do not detract from the amenity of the village.

Figure 1.1 Existing Site Visual Diagram (Source: Hyphen Architects)



Figure 1.2 presents a visual diagram outlining the various Masterplan elements (Proposed Development).

The Masterplan combines a village centre focal point, residential development in tandem with a technology park, renewable energy and community facilities. Waste heat from the technology park will provide a district heating supply for the residential/village centre. The development has been designed with the objective of protecting natural heritage, biodiversity and landscape and includes enhanced water features along with a high quality landscaped campus with linear parks for community and visitor use.

Figure 1.2 Proposed Site Layout Visual Diagram (Source: Hyphen Architects)

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The Planning Report prepared by John Spain Associates (JSA) sets out the planning history of the site and identifies how the Proposed Development accords with the policies and objectives of the Waterford City & County Development Plan 2022 - 2028. Where relevant, accordance with specific objectives is discussed within individual chapters of the EIAR.

A detailed description of the Proposed Development and the development site context is presented in Chapter 2 (Description of the Proposed Development.

1.2 Relevant Legislative Requirement for Environmental Impact Assessment

EIA is an essential tool in the implementation of EU environmental legislation. According to the Guidelines for Planning Authorities and An Bord Pleanála (ABP) on carrying out Environmental Impact Assessment (August 2018) the objective of the Directive 2011/92/EU as amended by 2014/52/EU ('the EIA Directive'), is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of public and private developments that are likely to have significant effects on the environment. The requirement for EIAR is set out in the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU); the EIA Directives have been transposed into existing Irish planning consent procedures i.e., the Planning and Development Act 2000 as amended (the Act) and Planning and Development Regulations, 2001 as amended (the Regulations).

The process involves the preparation of an EIAR by the applicant. This report is then subjected to review by the competent authority, who will also consult with the public and the relevant prescribed bodies. The competent authority will consider the EIAR as well as any other pertinent information before arriving at a reasoned conclusion regarding the probable significant effects of the Proposed Development on the environment.

The EIA Directive lists projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II) of the EIA Directive (2011/92/EU and 2014/52/EU), these Annex are transposed into Schedule 5 of the Planning and Development Regulations 2001 as amended. The EU Member States can choose to apply thresholds for Annex II projects or use a case-by-case examination, or a combination of both, to assess where EIA is required. In Ireland, a combination of both has been applied.

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Ireland's type of projects for which an EIA is mandatory is set out in the Schedule 5 Part 1 and Part 2 of the Regulations. The EPA Guidance (2022) requires an assessment beyond the general description of the project and to consider the component parts of the project and/or any processes arising from it. In considering the wider context and the component parts of the Proposed Development AWN have identified the thresholds of relevance to the proposal from Part 2 of Schedule 5; outlined in Table 1.1.

Table 1.1 Relevant Part 2 Schedule 5 Thresholds for EIA and determination of EIA requirement.

Development for the Purposes of:	Related Development Details	Exceeds Threshold?
1. Agriculture, Silviculture and Aquaculture (a) Projects for the restructuring of rural land holdings, undertaken as part of a wider proposed development, and not as an agricultural activity that must comply with the European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011, where the length of field boundary to be removed is above 4 kilometres, or where re-contouring is above 5 hectares, or where the area of lands to be restructured by removal of field boundaries is above 50 hectares.	Construction of the Proposed Development will require recontouring of rural lands for the c. 26.7 hectares Technology Park and Village Centre portion of the Proposed Development. The Proposed Development site exceeds the limit, quantity or threshold set out in Class 1(a); therefore, an EIA is mandatory under this Project Class.	Yes – EIA is mandatory under this class.
3. Energy Industry (a) Industrial installations for the production of electricity, steam and hot water not included in Part 1 of this Schedule with a heat output of 300 megawatts or more	The Proposed Development site features an Energy Centre with a capacity of c. 216 MWe and a Solar Farm with a peak capacity of c. 29.71 MWp. The Proposed Development site is not equal to nor does it exceed the limit, quantity or threshold set out in Class 3(a); therefore, an EIA is not mandatory under this Project Class.	No – EIA is not mandatory under this class.

1.2.1 Relevant Legislation, Policy, and Guidelines

This EIA Report has been prepared in accordance with the most relevant guidance and legalisation, including the following:

- EIA Directive (2011/92/EU) as amended by EIA Directive (2014/52/EU);
- Planning and Development Act 2000 (as amended);
- Planning and Development Regulations 2001 (as amended);
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Housing, Planning and Local Government, 2018);
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022);
- *European Commission,* Environmental Impact Assessment of Projects Guidance on Scoping (Directive 2011/92/EU as amended) (European Commission, 2017);
- *European Commission,* Environmental Impact Assessment of Projects Guidance on Screening (Directive 2011/92/EU as amended) (European Commission, 2017); and
- *Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017.

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1.3 Format of the EIA Report

This EIAR has been laid out using the grouped format structure, the report examines each environmental factor in a separate chapter (the chapters are listed in Table 1.2). These EIAR chapters have been prepared by suitably qualified expert(s) and have considered the construction and operational phases of the Proposed Development under the following headings:

- Assessment Methodology;
- Receiving Environment;
- Characteristics of the Proposed Development;
- Potential Impacts of the Proposed Development;
- Mitigation Measures;
- Monitoring or Reinstatement Measures;
- Residual Effects of the Proposed Development; and
- Cumulative Impacts of the Proposed Development

While the EIAR has the focus on the Proposed Development, each specialist chapters also considers the potential cumulative impact (as far as practically possible) of the Proposed Development with the any future development and the cumulative impacts with developments in the locality (including planned and permitted developments).

1.3.1 EIA Scoping and Consultation Processes

The scope of the EIAR has been defined at an early stage of the design process, the scoping process involves defining the scope of the EIAR early on in the design process to ensure that all relevant environmental issues are addressed in the subsequent studies.

To establish the scope, a comprehensive review of the development site's context, including its locality and any previously permitted developments, is undertaken. This review helps identify the specific matters that need to be covered within the environmental impact assessment. By identifying and addressing these issues upfront, the EIAR aims to provide a comprehensive understanding of the potential environmental impacts associated with the Proposed Development.

The structure and presentation of the EIAR is designed to facilitate the dissemination of information to the public and stakeholders. The EIAR is structured in a clear and accessible manner, allowing easy navigation through its content. Additionally, a non-technical summary is provided, which presents a concise overview of the report's main findings and conclusions. The presentation of the information is done in a way that is understandable to both technical experts and non-experts, enabling a wider audience to grasp the key findings and implications of the assessment.

Public participation in the Environmental Impact Assessment (EIA) process is facilitated through the statutory planning application process. As part of this process, the EIAR is made available to the public, allowing interested individuals and organizations to review and comment on the report. This provides an opportunity for public input, ensuring that a wide range of perspectives are considered before making decisions regarding the Proposed Development.

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To further enable public access to the EIAR, information about the report is also made available through the Department of Housing, Planning, and Local Government's EIA Portal. This portal serves as a centralised platform that can be accessed by the public, stakeholders, and regulatory authorities. By utilising this portal alongside the Mayo County Council online planning systems, broader public participation and scrutiny, as well as transparency and accountability in the EIA process is enabled.

Ensuring public awareness and involvement is a core objective of the EIAR process in Ireland. By disseminating the information contained in the EIAR, the aim is to make the public and local community aware of the likely environmental impacts of the proposed project prior to the granting of consent. This empowers the public to participate meaningfully in the decision-making process and voice their concerns or provide feedback.

The scoping and consultation are essential components of the EIAR process. The early definition of the EIAR scope ensures that all pertinent environmental issues are addressed, while the structure and presentation of the report, along with the provision of a non-technical summary, facilitates the dissemination of information. Public participation is actively encouraged through the statutory planning application process and the Department's EIA Portal, aiming to ensure that the public and local community are informed and have a voice in the decision-making process regarding Proposed Developments.

A pre-planning meeting was undertaken with the Planning Department of Waterford County Council (WCC) on 04 December 2024. Feedback from this consultation was incorporated into the design of the Proposed Development and into the environmental considerations assessed in this EIAR.

1.3.2 Contributors to the EIA Report

The preparation and co-ordination of this EIAR has been completed by AWN Consulting in conjunction with experienced subject matter experts. Each environmental specialist of the applicants project team was commissioned having regard to their previous experience in EIA; their knowledge of relevant environmental legislation relevant to their topic; familiarity with the relevant standards and criteria for evaluation relevant to their topic; ability to interpret the specialised documentation of the construction sector and to understand and anticipate how their topic will be affected during construction and operation phases of development; ability to arrive at practicable and reliable measure to mitigate or avoid adverse environmental impacts; and to clearly and comprehensively present their findings.

Table 1.2 below outlines the specific responsibilities of each author(s) and their corresponding EIAR chapter(s). Further information regarding the qualifications and relevant experience of the EIAR team can be found below the table.

Table 1.2 Roles and Responsibilities in the EIA Report

EIA Chapter No.	Chapter Title	Company and Consultant
	Non-Technical Summary	AWN; Input from each specialist
Chapter 1	Introduction	AWN; Sarah Tierney and Teri Hayes
Chapter 2	Description of the Proposed Development	AWN; Teri Hayes
Chapter 3	Alternatives	AWN; Sarah Robertson

EIA Chapter No.	Chapter Title	Company and Consultant
Chapter 4	Population and Human Health	AWN; Natalie Machado and Teri Hayes
Chapter 5	Land, Soils, Geology and Hydrogeology	AWN; Rashaqat Ali Siddiqui and Teri Hayes
Chapter 6	Hydrology	AWN; Rashaqat Ali Siddiqui and Teri Hayes
Chapter 7	Biodiversity (including AA Screening Report)	FERS; Dr Emma Reeves
Chapter 8	Air Quality	AWN; Ciara Nolan
Chapter 9	Climate	AWN; Dr Edward Porter
Chapter 10	Noise and Vibration	AWN; Justin Kwan
Chapter 11	Landscape and Visual	KFLA; Matthew Mulvey
Chapter 12	Archaeological, Architectural and Cultural Heritage	CRDS; Dr. Stephan Mandal
Chapter 13	Material Assets – Traffic and Transportation	Atkins Realis; Nichloas Van Den Berg
Chapter 14	Material Assets - Utilities	Coyle Environmental; Emma Yore and Clodagh Kissane
Chapter 15	Material Assets – Waste Management	Coyle Environmental; Emma Yore and Clodagh Kissane
Chapter 16	Interactions – Interrelationship between the Aspects	AWN; Input from each specialist

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1.3.2.1 EIA Project Team Qualifications and Relevant Experience

Project Director/EIA Co-ordinator/Selected Chapters

Teri Hayes, BSc MSc PGeo Ad Dip Env & Planning. Teri is a member and former president of the International Association of Hydrogeologists (Irish Group) and a professional Member of the Institute of Geologists. Teri is a director with AWN Consulting with 30 years of experience in water resource management and environmental assessment and remediation. Teri has contributed to numerous environmental impact assessments and design of appropriate mitigation measures, acted as an expert witness at public hearings, lectured in EIA and providing expert advice on EIA sections for planning authorities. She has qualified for the register of "competent person" for contaminated land assessment as required by the EPA under the Institute of Geologists of Ireland an d has completed a Diploma in Environmental and planning law.

Introduction

Teri Hayes & Sarah Tierney. Sarah Tierney is a Senior Environmental Consultant with AWN Consulting and a graduate member of the Institute of Environmental Management and Assessment (GradIEMA). She has experience in EIA Reports, EIA screening and EPA IE licence applications and compliance reporting for a range of developments, such as pharmaceutical plants, ICT facilities and residential developments. She holds a BA in Environmental Science from Trinity College Dublin and is a member of the Environmental Sciences Association of Ireland.

Description of the Proposed Development

Teri Hayes.

Alternatives

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Sarah Robertson. Sarah is a Senior Environmental Consultant in AWN Consulting with responsibility for IED licence applications, GMM and DAFM ABP certificates. She also provides EIAR management and specialist input to EIAR chapters. Sarah has over ten years experience working in the environmental field in impact assessment, EIAR management, environmental masterplans, urban planning, waste management, specialist ecological surveys, AA screening and Natura Impact Statements. Sarah holds a BA. Hons (mod Science), MSc. and a Diploma in Environmental Engineering, and has worked in Ireland, the UK, and the USA.

Population and Human Health

Teri Hayes & Natalie Machado. Natalie Machado, is an Environmental Consultant with AWN Consulting. Natalie holds an MBA in Project Management & Environmental Sustainability by the Pontifical Catholic University of Rio Grande do Sul (PUCRS) and a BSc in Biological Sciences by the Federal University of Rio Grande do Sul (UFRGS). Natalie has experience in project management, environmental impact assessment, freshwater ecotoxicology, scientific research and academic sector, effluent testing, international environmental consultancy, corporate and environmental sustainability.

Land, Soils, Geology, Hydrogeology, and Hydrology

Teri Hayes & Rashaqat Ali Siddiqui (BSc, Msc, MIT). Ali is a hydrogeologist with over 6 years' experience in water resource management and impact assessment. He has a Masters in Hydrogeology and is a former Education Secretary of the Irish chapter for the Association of Hydrogeologists (IAH). Ali's specialist area of expertise is water resource management, Site investigation and monitoring, Contaminated land Assessment, hydrological assessment and environmental impact assessment.

Biodiversity

Dr Emma Reeves. Dr Emma Reeves is a Senior Ecologist with Forest Environmental Research and Services based in County Meath, since 2013. Emma's field skills lie in botany, ornithology, mammal, including bat survey, invasive species and habitat identification/management. Biodiversity and sustainability are Emma's key passions having significant interest in close to nature forestry, apiculture and climate. On a voluntary basis Emma engages with community groups and NGO's to achieve positive outcomes for biodiversity. Emma routinely writes AA, NIS, EcIA, and EIAR screenings. She has previous experience with the environmental impact assessment process on Strategic Housing Developments and with the tailings pond facility of Boliden, Tara. She has recently completed an advanced diploma in Planning and Environmental Law with Kings Inns.

Air Quality

Ciara Nolan. Ciara Nolan (Principal Air Quality Consultant) holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). She specialises in the fields of air monitoring, air quality & climate assessments for EIA and air dispersion modelling.

Climate

Dr Edward Porter. Dr Edward Porter is a Director with responsibility for Air Quality with AWN Consulting. He holds a BSc from the University of Sussex (Chemistry), has completed a PhD in Environmental Chemistry (Air Quality) in UCD where he graduated in 1997 and is a Full Member of the Royal Society of Chemistry (MRSC CChem), the Institute of Environmental Sciences (MIEnvSc) and the Institute of Air Quality Management (MIAQM). He specialises in the fields of air quality, EIA and air dispersion modelling.

Noise and Vibration

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Justin Kwan. Justin Kwan (Senior Acoustic Consultant) holds a MEng and PhD in Mechanical Engineering from University of Leeds in UK. Justin is experienced in both environmental and building acoustics. He has been working in the field of acoustics since 2000 and has gain experience from projects in Asia and Ireland. He is a member of the Institute of Acoustics. He has extensive knowledge in the field of mechanical noise treatment, room acoustics, sound insulation and inward impact assessments and completed numerous hotel projects.

Landscape and Visual Impact Assessment

Matthew Mulvey, BSc (Hons) Lands Arch, MILI. Matthew is a Senior Landscape Architect with 8 years professional experience. He has considerable experience in the field, having worked as Project and Senior Landscape Architect on a wide range of schemes varying in scale, type, location and built form. Recently he has acted as project landscape architect on Data Centre projects for a range of clients. In specific regard to LVIA he has worked across a range of projects including industrial developments, data centres and infrastructure projects.

Archaeological, Architectural and Cultural Heritage

Dr Stephen Mandal holds an honours degree in Science (Geology) from Trinity College Dublin (1991) and a PhD in Geoarchaeology, also from Trinity College Dublin (1995). Following two years as a post-doctoral researcher in University College Dublin, he founded CRDS Ltd (established in 1997; incorporated in 1999), archaeological, cultural and architectural heritage consultants. As one of Ireland's leading heritage consultancies for almost 25 years, CRDS has employed over 600 archaeologists, undertaken some of the largest and most significant archaeological excavations throughout Ireland, and has won numerous national and international awards. He has overseen the writing of the Archaeology, Architectural and Cultural Heritage Chapters of in excess of 100 EIARs dating from 1997 to present. This experience covers the island a wide range of development types including small scale developments close to culturally sensitive sites, large scale developments and liner developments including roads, ESBI power lines, railways and cycle paths.

Traffic and Transportation

Nichloas Van Den Berg. The Material Assets – Traffic and Transportation EIAR chapter was prepared by Nicholas Van Den Berg, who has 11 years' experience as a traffic and transportation engineer. Nicholas is a Chartered Engineer with Engineers Ireland and has a Bachelor of Science (BSc) in Civil Engineering.

Material Assets - Waste Management and Utilities

Emma Yore. Emma Yore is an experienced Environmental Consultant with over five years in the environmental sector and holds a Bachelor (Hons.) Degree in Environmental Science from the Institute of Technology, Sligo. She has experience through various projects since joining Coyle Environmental Ltd with a current focus on the environmental sector. She brings a strong background in environmental science, sustainability, and regulatory compliance. Her expertise in research, environmental impact assessments, and management planning ensures the successful execution of environmental projects while meeting compliance and sustainability standards. Emma's key capabilities are in report writing of Appropriate Assessments, Environmental Impact Assessments, EIAR Chapters and using software such as ArcGIS Pro.

Clodagh Kissane. Clodagh Kissane is an experienced Environmental Consultant and Environmental Monitoring Coordinator with a strong academic foundation in science and environmental health and safety. She brings a blend of teaching experience, technical expertise, environmental monitoring and project leadership to her work. She has previous experience as an environmental technician managing the environmental monitoring section of Coyle Environmental. Clodagh holds a Bachelor (Hons.) Science with Education from University College Cork and a Post Graduate Higher Diploma in Environmental Health and

Safety Management from Atlantic Technological University Sligo and is certified in Environmental Management for Construction. She has a background in both teaching and environmental science, Clodagh has strong communication skills, technical expertise, and a commitment to sustainability with an ability to lead teams, engage with clients, and integrate health and safety protocols.

She has experience through various projects since joining Coyle Environmental Ltd with involvement in compliance, legislation, and environmental monitoring within sectors such as construction and mining. She has strong capabilities in environmental monitoring, data analysis, and project coordination. She has hands-on experience in EPA IPPC licencing, TEDL Licensing, Planning Permission Applications, IAS screening reports and EIAR chapters for a range of facilities and large-scale industrial sites.

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1.4 Description of Effects

The quality, magnitude and duration of potential effects are defined within each specialist chapter of this EIA in accordance with the criteria provided in the EPA *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (2022) as outlined in Table 1.3.

Table 1.3 Description of Effects as per EPA Guidelines (2022)

Effect Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
	Profound	An impact which obliterates sensitive characteristics
Duration of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years.
	Medium-term Effects	Effects lasting seven to fifteen years

Effect Characteristic	Term	Description
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration
Probability of Effects	Likely Effects	The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of Effects[1]	Indirect Effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents

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1.5 Additional Assessments Required

The additional reports and/or assessments required under Legalisation or EU Directives other than the EIA Directive in respect of the Proposed Development are described in this section.

1.5.1 Prepared for Planning Stage

1.5.1.1 Habitats Directive (Directive 92/43/EEC) and Birds Directive (Directive 2009/147/EC)

The main EU legislation for conserving biodiversity is the Directive 2009/147//EC of the European Parliament and of the Council of November 2009 on the conservation of wild birds (Birds Directive); and the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

[1] For the purposes of facilitating the Competent Authority in conducting Environmental Impact Assessment as defined by Annex 1 of the EU Directive, the terms "imperceptible effects", "not significant effects", "Slight effects", and "moderate effects" used within this report, while exhibiting varying degrees of impact, are all considered to be without significant consequence.

The Habitats Directive is the cornerstone of habitats and species protection in Ireland. The Habitats Directive (92/43/EEC) and the associated Birds Directive (2009/147/EC) are transposed into Irish legislation by Part XAB of the 2000 Act and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) as amended.

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The environmental sensitivity of the Proposed Development site in respect of Natura 2000 sites designated pursuant to the Habitats Directive and the Birds Directive been considered with reference to the application Appropriate Assessment Screening, which comprises an initial impact assessment of a project; examining the direct and indirect impacts that it might have on its own or in combination with other plans and projects, on one or more Natura 2000 sites in view of the sites' conservation objectives.

The AA Screening and NIS has been prepared for the Proposed Development by Emma Reeves of FERS and is included with the planning application (Chapter 7 – Appendix 7.1).

1.5.1.2 Water Framework Directive (Directive 2000/60/EC)

The Water Framework Directive (WFD) 2000/60/EC aims to protect and enhance the quality of the water environment (both surface water and groundwater) across all European Union member states. The WFD requires all EU member states to classify the current condition or 'status or potential' of surface and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach 'good status or potential' during the next river basin management planning cycle. Environmental Protection Agency (EPA) and other stakeholders such as planning authorities are the competent authority for implementing the WFD in Ireland. As part of their role, these authorities must consider whether proposals for new developments (other than where exemptions apply) have the potential to:

- Cause a deterioration of a water body from its current status or potential; and/or
- Prevent future attainment of good status or potential where not already achieved.

As a result, new developments that have the potential to impact on current or predicted WFD status are required to determine whether the project will cause a deterioration of the status of the body of surface water or if it would jeopardise the attainment of good surface water status, having regard to the existing status of the water body as designated in accordance with the Directive.

A WFD Assessment has been undertaken for the Proposed Development, the results of which are presented in Appendix 6.3 of Chapter 6 (Hydrology & Hydrogeology).Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC and Directive 2012/18/EU) and COMAH Regulations (S.I. No. 209 of 2015)

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

The purpose of the COMAH Regulations is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

The Proposed Development will not be a Seveso/COMAH facility. There will be no substances stored on site controlled under Seveso/COMAH as back-up generators will run on HVO rather than diesel.

The Health and Safety Authority (HSA) register shows that the Proposed Development is not located within close proximity or within statutory consultation distances of any Notified Seveso Establishment.

1.5.1.3 Energy and Sustainability Statement

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The Energy Statement (Homan O'Brien, 2025) provides an overview of the energy strategy, mechanical and electrical systems for the proposed ICT facilities and Energy Centre and how, where appropriate, the development addresses the requirements set out in the building regulations TGD Part L, the government Statement on the Role of Data Centres in Ireland's Enterprise Strategy and the Waterford City & County Development Plan 2022 – 2028. Additionally, it provides an overview of the energy strategy, mechanical system and an assessment of building regulation compliance at planning stage for the proposed Village Centre at Kilmeaden, Co. Waterford.

1.5.1.4 Landscape Plan

KFLA have prepared a Landscape Masterplan for the Proposed Development which includes a linear park, stretching from the village centre to the end of the technology park and includes a new cycle and pedestrian route. The plan incorporates protection of existing pond and improving biodiversity within the entire site.

1.5.1.5 Construction Management Plan

Atkins Realis has prepared a CMP which will be required to be implemented by the contractor during construction. This outlines and explains the construction techniques and methodologies which will be implemented during construction of the Proposed Development. The CMP incorporates mitigation measures outlined in the EIA report as they relate to the construction phase. The CMP includes emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. This is an active document which is continuously updated to manage risk during the construction programme.

The CMP will be implemented and adhered to by the Construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

1.5.1.6 Resource Waste Management Plan

Coyle Environmental have prepared as Preliminary Construction Resource and Waste Management Plan (pCRWMP) The purpose of this Resource Waste Management Plan (RWMP) is to ensure that all materials arising from all works associated with the proposed Kilmeaden Technology Park, Village Centre and Solar Panel Farm are managed so that the materials can be reused, recycled or disposed of in accordance with waste management hierarchy and current legislative and best practice requirements.

1.5.2 Prepared Following Commissioning

1.5.2.1 Industrial Emissions Directive (Directive 2010/75/EU)

The Industrial Emissions Directive 2010/75/EU was transposed into Irish law by under the European Union (Industrial Emissions) Regulations 2013, S.I. 138 of 2013.

The Regulations primarily amend the Environmental Protection Agency (EPA) Act 1992 (as amended) to introduce a system of licensable activities. The First Schedule of EPA Act 1992 lists the activities that are licensable.

An Industrials Emissions Directive ("IED") licence application is required for the Proposed Development under Class 2.1 "Combustion of fuels in installations with a total rated thermal input of 50 MW or more."

1.5.2.2 Greenhouse Gas Emissions Regulations

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The Proposed Development will require an EPA Greenhouse Gas (GHG) Emissions permit in accordance with the EPA Act 1992, as amended. The application will be submitted by the Operator prior to commencement of the scheduled activity and meets the requirements of the Climate Action and Low Carbon Development (Amendment) Act 2021 and the obligation imposed on An Bord Pleanála and local authorities (in Section 17) to *"in so far as practicable, perform its functions in a manner consistent with —*

a. *the most recent approved climate action plan,*
b. *the most recent approved national long term climate action strategy,*
c. *the most recent approved national adaptation framework and approved sectoral adaptation plans,*
d. *the furtherance of the national climate objective, and*
e. *the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."*

The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the individual emergency back-up generators.

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Chapter 2 – Description of the Proposed Development

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

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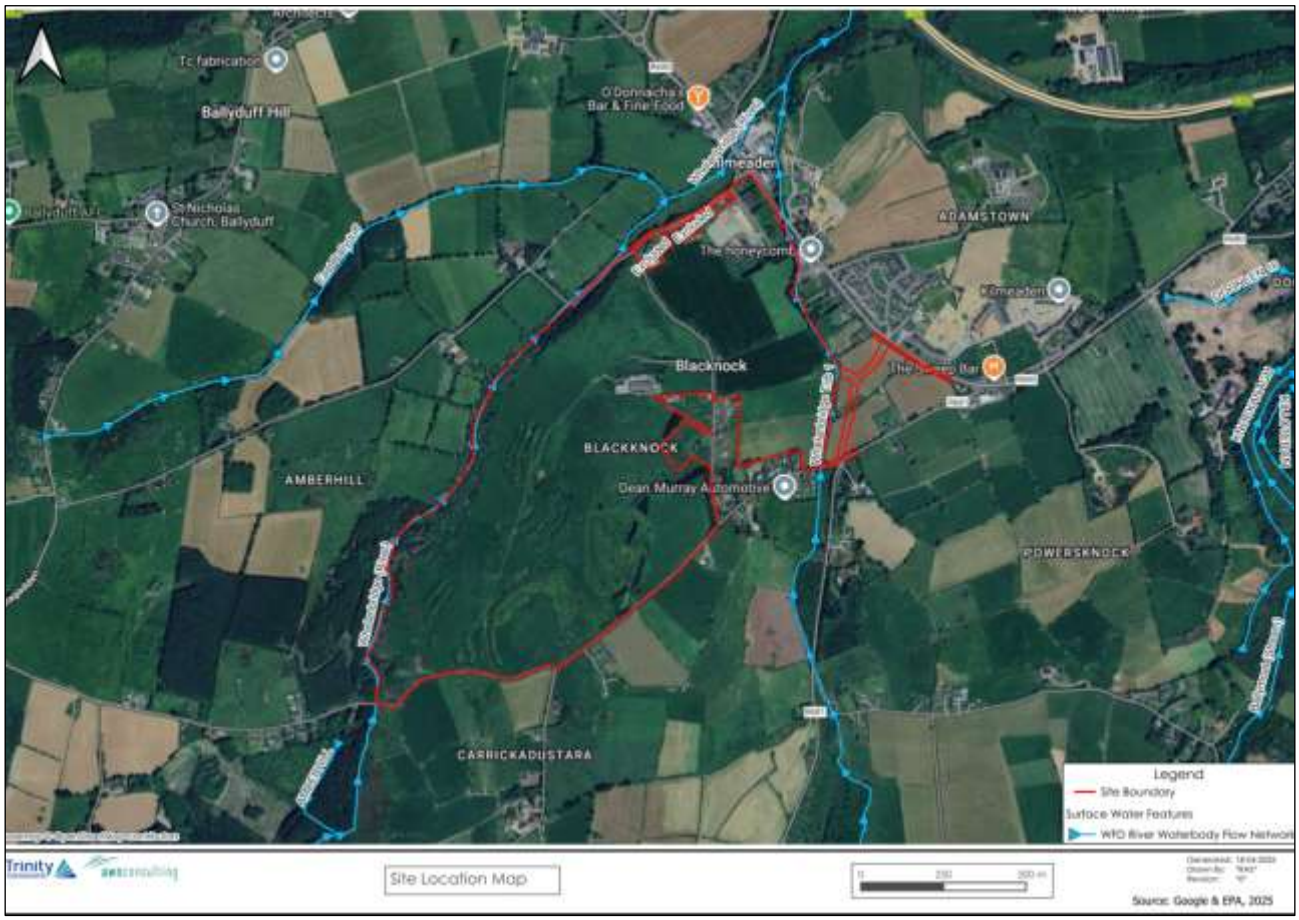
2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

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2.1 Introduction

The proposed development is located in Kilmeaden, Co Waterford and comprises a number of distinct but connected areas; a new village centre, a solar farm and rewilding area, battery storage, and a data centre with associated energy centre (the "proposed development"). The proposed development location lies to the south of the R680, within the townlands of Ballyduff East, Amberhill and Blackknock, Co Waterford. Figure 2.1 provides the site setting.

Figure 2.1 Proposed Development Lands (indicative red line boundary) (Source: Google Earth)



The proposed development covers an area of 108.64 hectares of which c. 26.766 hectares is the proposed Technology Park and Village Centre, and the remainder is the proposed Solar Panel Farm (overall c. 78 hectares).

The various development areas are connected with landscaped areas, as well as pedestrian and cycling routes, to provide for an integrated and permeable form of development, which will enhance the economic prosperity and amenity of Kilmeaden.

A 220 kV substation development is also proposed for development within the red line boundary, which will act as the landfall point for an offshore windfarm off the coast of Waterford. Planning for the 220kv grid connection and a future gas connection will be undertaken under a separate SID planning application.

2.2 Methodology

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This chapter presents the description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development. The scope of this chapter aligns with the relevant legislation and guidance which comprises the following:

- EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive);
- European Commission 'Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report' (2017); and
- EPA 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2022) (herein referred to the as the EPA EIA Report Guidelines 2022).

This guidance advises that description of the existence of the project should define all aspects of the proposed lifecycle of the facility, including:

- Description of Construction;
- Description of Commissioning;
- Operation of the Project;
- Changes to the Project; and
- Description of Other Related Projects.

This description is not exhaustive, and as such the EIA Report should be read in conjunction with the full application package. The description of the proposed development is described in this chapter in terms of those environmental topics that will form the basis of the impact assessment process and the characteristics of the proposed development and potential effects. The specialist assessments reported in this EIA Report have been conducted using this description, and the full application package as a guide to the details of the development under consideration.

2.3 Description of the Existing Development Site

2.3.1 Existing Land Use

The subject site comprises undeveloped agricultural lands and lands previously developed for the Kilmeaden Cheese Factory (brownfield). The topography rises significantly for the from east to west with site levels range from 13.7m to 89m.

The brownfield (northeast) portion of the site contains existing hardstanding areas of the old roads and buildings of the Kilmeaden Cheese Factory. The Blackknock hill area of the site includes constructed wetlands previously used for treatment of effluent. These ponds have largely dried out over time but two ponds still retain water.

The Whelan's Bridge River and tributary border the northern and eastern site boundaries and join the River Suir approximately 1.7 km for the site. As such the site has a hydrological pathway with the Lower River Suir SAC (Site Code: 002137 Site Code: 002137) and the Upper Suir Estuary transitional waterbody.

A list of relevant planning permissions from the area surrounding the proposed development within the previous five years is shown in Appendix 2.1. Relevant local planning permissions are presented below. Where relevant each chapter has considered cumulative effects from permitted planning applications and expected future grid and gas connections.

Table 2.1 Selection of local planning permissions. Full listing in Appendix 2.1

Planning Ref. WCC	Project Type	Date of Grant
WCC Reg. Ref 21214	Residential Development East of Kilmeaden (Partially Complete)	Granted July 2021
WCC Reg. Ref 22507	Residential Development East of Kilmeaden (Partially Complete)	Granted Feb 2023
WCC Reg. Ref 16/309	Solar Farm (west of subject lands)	Granted Oct 2016
WCC Reg. Ref 16737	Solar Farm (south of subject lands)	Granted Sept 2017
WCC Reg. Ref 1932 (amendment of Reg. Ref 16737)	Solar Farm	Granted April 2019

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2.3.2 Proximity to Industrial Emission Licenced Facilities, Seveso and COMAH Sites

The proposed development site surroundings are characterised by extensive agricultural lands and small residential settlements. There are no large industries within the study area and there are only a small number of commercial businesses within 2.5km from the proposed development. The closest industrial facilities to the proposed development are located in Waterford city, c. 6.5km northeast.

According to the HSE online register of Notified Seveso Establishments List of Establishments - Health and Safety Authority, there are no Upper or Lower Tier Seveso Establishments within the proposed development study area. The closest notified Seveso Establishment is the Upper Tier Establishment, Trans-Stock Warehousing and Cold Storage Ltd, located at Christendom, Ferrybank, Waterford, c. 10.5km northeast from proposed development redline boundary.

2.3.3 Existing Site Utilities, Infrastructure and Access

Existing and planned utilities, infrastructure and access are fully described in Chapter 13 Traffic and Chapter 14 Material Assets (Utilities). A brief description is provided below.

2.3.3.1 Existing Water and Wastewater Utilities

Utilities are described in Chapter 14. The site contains existing services Uisce Éireann (UÉ), Gas Networks Ireland (GNI), Electricity Supply Board (ESB) and Eir.

There are several water supply pipes passing through the site and a diversion application to relocate those watermains away from the new development has been submitted to UÉ (ref. DIV24393).

Regarding the foul sewer record map from UÉ, no existing foul network is shown inside the site boundary, with the exception of a disused septic tank and percolation area believed to be present in the southwest portion of the site. A foul sewer line is located off site on the north side of the site. Two further drainage lines were found to be located on the south east of the site.

The record maps from GNI, show an installation at the northeast part of the site, with a high-pressure transmission pipe and two low pressure distribution pipes.

The record maps from ESB identify several LV, MV and HV overhead lines.

The record maps from Eir identify several telecom ducts near the area of the old Cheese Factory.

2.3.3.2 Existing Access

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The main site is currently accessible via the existing access to the Kilmeaden Cheese Factory, which is located off the local "Amberhill" road which runs along the northeast of the redline boundary before joining the R680.

Another local road divides the two land banks of the proposed development (north – south). A private road (Cul de Sac) leads off this road to Blackknock Hill lands.

Figure 2.2 presents the existing features.

Figure 2.2 Existing Features

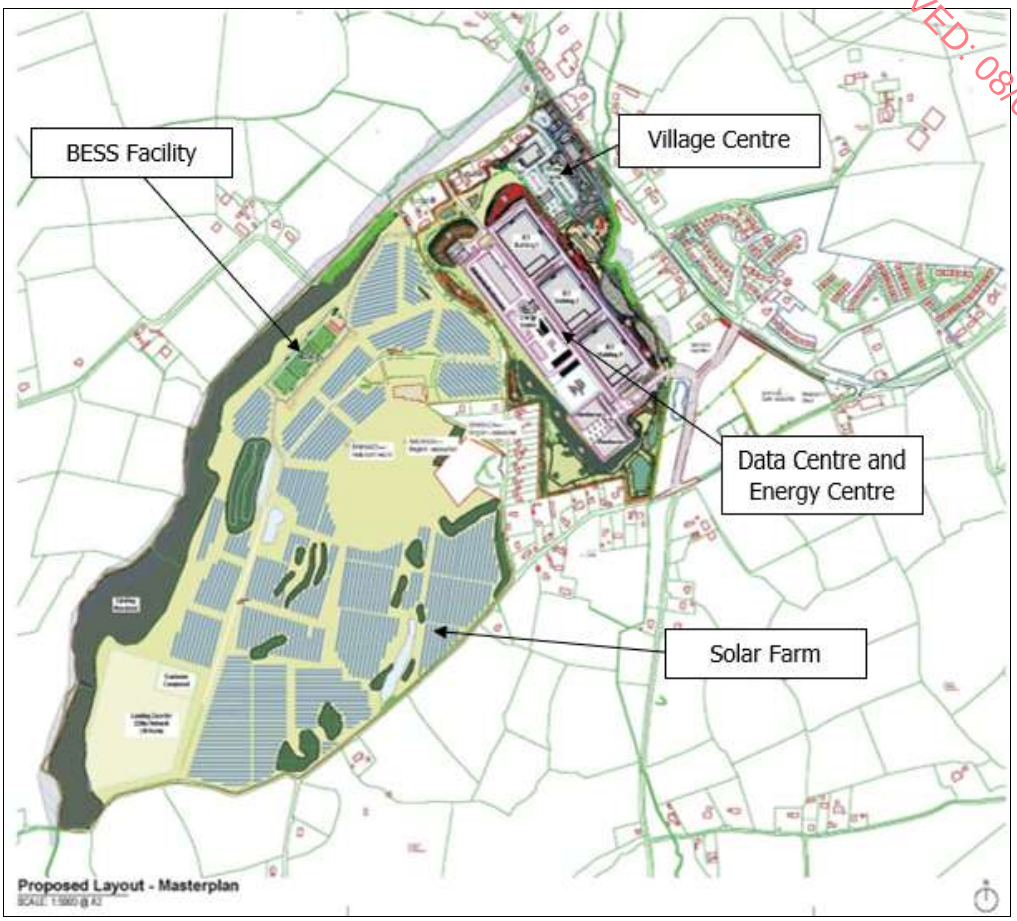


2.4 Characteristics of the Proposed Development

The proposed development is presented in Figure 2.3 to Figure 2.10 and described below. Details of the layout are presented in the planning drawings prepared by Hyphen Architects and AtkinsRealis. The landscape plan is provided by Kennedy Fitzpatrick Landscape Architecture (KFLA). The development comprises a Village Centre and Technology Park with new connections provided from the village to the proposed area of green infrastructure.

Figure 2.3 Proposed Development Layout (Source: Hyphen DRG No. KMMP-HYP-ZZ-ZZ-DR-A-0100) Redline – Site Boundary.

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The proposed development comprises the development of the former cheese factory site and adjoining lands to provide for a mixed use village centre, technology park, and renewable energy development on a total site area of 108.79 hectares. The proposed development will consist of the following:

The demolition of 2 no. existing single storey outbuildings and 1 no. AGI building (126 sq.m. GFA in total) in the northern portion of the site, along with all site clearance and enabling works required to facilitate the proposed development.

In the northern portion of the site the construction of a new village centre comprising the following:

- A two-storey mixed-use building (fronting onto the R680) comprising a gym, café, health centre, pharmacy, and office space, with a total GFA of c. 1,856 sq.m. (c. 10.3m in height).
- A two-storey community centre (with a GFA of c. 847 sq.m. and c. 11m in height).
- 2 no. three-storey apartment buildings (Apartment Blocks A and B) comprising 48 no. units in total, including 6 no. 1 bedroom apartments and 42 no. 2 bedroom apartments. The apartment buildings have a combined gross floor area (GFA) of c. 5,374 sq.m. and the buildings are c. 14.3m in height. Each of the apartment buildings include private open space in the form of patios and balconies, along with bin stores, communal open space, and access arrangements.
- A two-storey supermarket (including off-licence) comprising a GFA of c. 1,605 sq.m. (c. 1,514 sq. m at ground floor level and c. 91 sq. m . at first floor level) with a height of c. 8.2m . A bring bank will be provided to the south of the supermarket.
- A two-storey childcare facility building with a GFA of c. 1,345 sq.m. (c. 10m in height), along with adjacent outdoor play area.
- A Multi-Use Games Area (MUGA), located adjacent to Apartment Block A and the childcare facility.

- A two-storey commercial / office building comprising 4 no. commercial units, (with a GFA of c. 614 sq.m. and c. 10.1m in height).
- 2 no. two storey warehouse buildings (each with a GFA of c. 562 sq. m. including ancillary office space and staff welfare facilities, with an overall height of c. 10m).
- A District Heating Plant Room (with a GFA of c. 14 sq. m. and c. 3.8m in height) to provide district heating from the technology park to the village centre, bin stores, lighting, access arrangements, and the provision of areas of public realm and open recreational spaces including a new village square.

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In the central portion of the site the construction of a new technology park comprising the following:

- 3 no. two storey (with two mezzanine level), information and communication technology (ICT) facility buildings, each with a GFA of c. 24,033 sq.m (c. 72,099 sq.m GFA in total), and with a height (to parapet level) of c. 19.8m and a maximum flue height of c. 25m.
- Each of the 3 no. ICT facility buildings will accommodate ICT equipment rooms, associated electrical and mechanical equipment rooms, loading bays, maintenance and storage space, office administration areas, and staff facilities, emergency generators and flues, and plant at roof level. External plant rooms (with an overall height of c. 3.7m) and modular water tanks will be provided adjacent to each of the ICT facility buildings.
- An energy centre building (with a GFA of c. 3,720 sq.m and with a parapet height of c. 13.8m) including 16 no. gas powered turbines, associated flues (with a height of c. 29.8m), associated ancillary containers and tanks, backup fuel pumps and tanks, fire tanks (with a height of c. 12.8m) and pump house, MCC control room (with a GFA of c. 41 sq.m.), welfare and storage facilities (with a GFA c. 60 sq.m.), a three storey control room building with basement (with a GFA of c. c. 5,343 sq.m. and an overall height of c. 18.9m), a single storey with basement MV building (with a GFA of c. 1,246 sq.m. and an overall height of c. 5.3m), step up and step down transformers, and 7 no. blackstart generators.
- 2 no. warehouses with ancillary office space, with a GFA of c. 3,121 sq.m. each, and with a height of c. 14.2 metres
- A gas above ground installation (AGI) and pressure regulating and metering station (PRMS) compound, (comprising an AGI Building, Boiler House Kiosk, E&I Kiosk, Control Room and Skid House) with a combined GFA of c. 202 sq.m.), 3 no. ICT pumphouses (c. 40 sq.m. each), and two single storey guardhouses (each with a GFA of c.29 sq.m).

In the southern portion of the site the construction of a of a solar farm with PV arrays consisting of 43,056 PV panels mounted on concrete footings, 3 no. single storey transformer cabins (with a combined GFA of c. 54.6 sq.m), a battery energy storage system (BESS) compound with an area of c. 6,682 sq.m.(comprising modular battery units within a fenced compound, along with associated electrical equipment and transformers), internal access tracks, and security fencing.

In the western portion of the site the construction of a new vehicular access (including a bridge over an existing watercourse) to the Technology Park to be provided between the R680 and the R681. The primary vehicular access to the village centre will be facilitated via the existing access from the local road to the north. Pedestrian and cycling access to the village centre will be facilitated via both the local road and R680. Access to the Solar farm is provided via the local road to the north of the solar farm.

Provision of areas of public open space and a walking/cycling route which extends from the village centre to the southeast of the Technology Park. The development provides 441 no. car parking spaces and 267 no. cycle spaces. The development includes provision of landscaping and planting throughout, PV panel zones at roof level, boundary treatments, signage zones, site lighting, and all associated site services and development works, including underground foul and storm water drainage network and sustainable urban drainage systems, and all ancillary works.

The new village centre shall be provided with separate connections to the 10KV ESB network to meet power demand. The village centres aims to be the first new village centre in Ireland to be 100% fossil fuel free. This will be achieved by integrating renewable energy solutions and pioneering waste heat

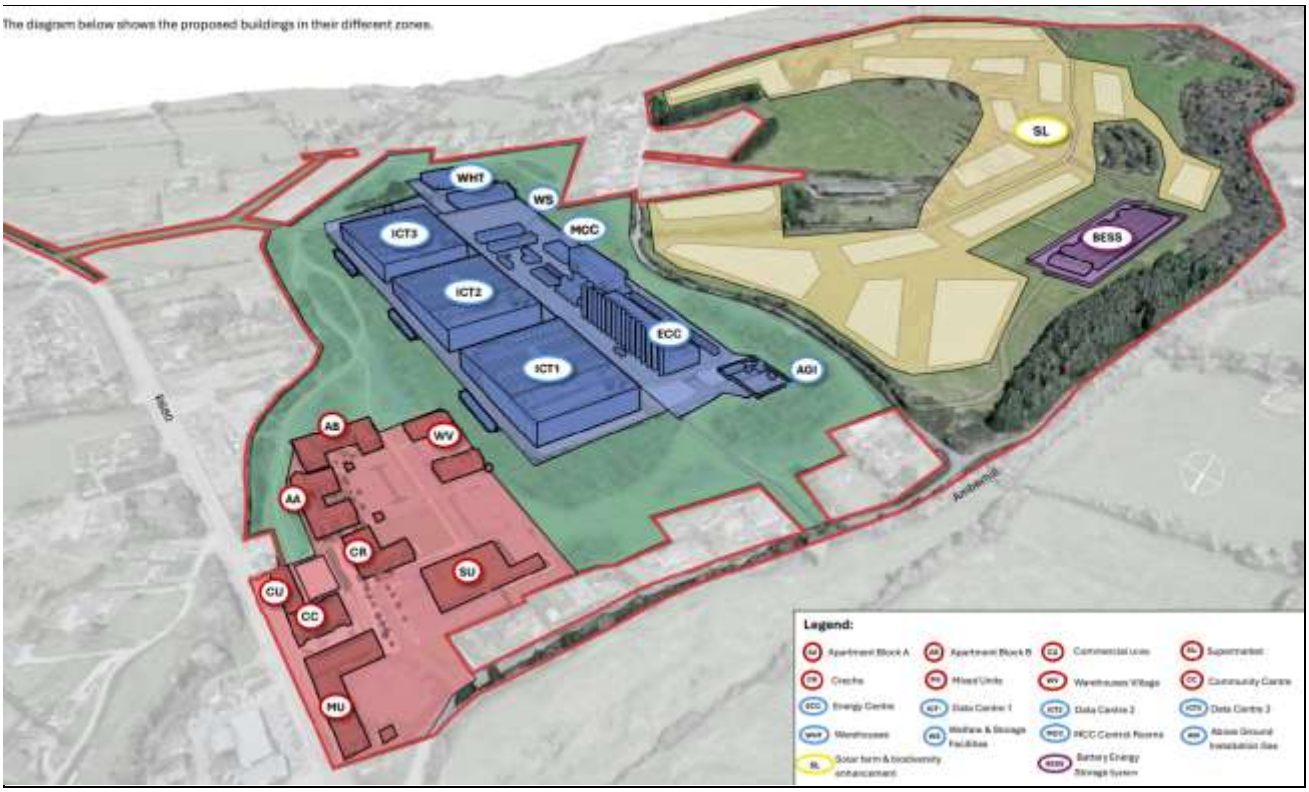
recovery systems, adopting a circular approach to energy efficiency and resource management. Waste heat will be captured for reuse in the proposed village centre. Waste heat plate heat exchanger within each ICT facility shall remove heat from the facility side chilled water system before it is exhausted to the atmosphere. This waste heat will be distributed to the village centre through a hydraulic flow and return piped water distribution system. The potential for off site heat recovery and required district heating infrastructure will be subject to feasibility assessment by WCC.

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Two small buildings and an AGI Drawing will be demolished as part of the development. These are presented on drawing KMM-HYP-ZZ-ZZ-DR-A0103.

Figure 2.4 taken from the Architectural Design Statement prepared by Hyphen Architects provides the layout within the site.

Figure 2.4 Site Layout Diagram (Hyphen Architects, 2025)



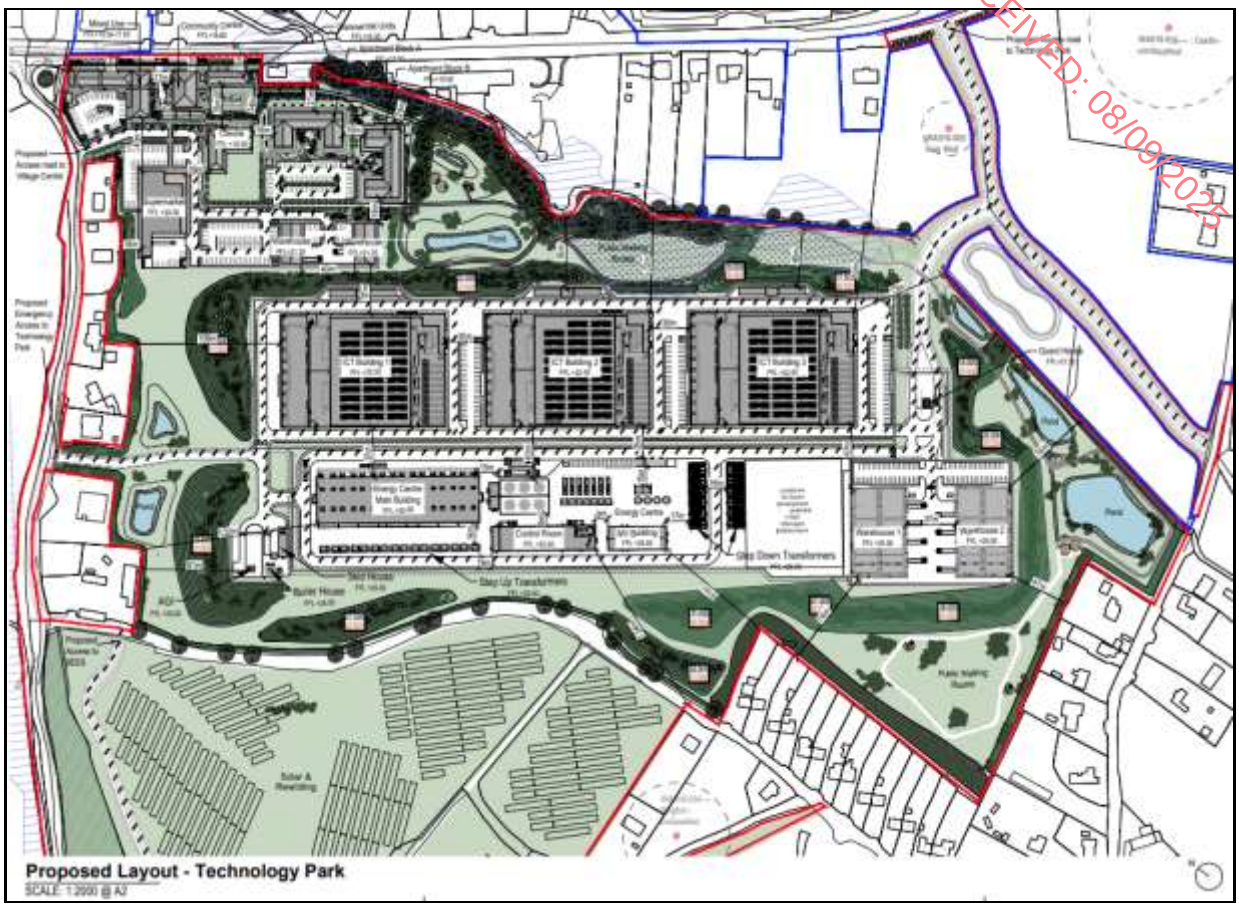
2.4.1 Technology Park (Energy Centre and Data Centres)

Energy Centre (Power Generation Facility)

The technology park campus is located in the centre of the masterplan. The proximity to the surrounding land uses has influenced the design and technology used. The park will be surrounded by security fencing as required for the nature of the development but a green zone will form a buffer around the technology park featuring new walking and cycling routes. The power generation facility and datacentre development is presented below.

Figure 2.5 Proposed Energy and Data Centre (KMMP-HYP-ZZ-ZZ-DR-A-0101)

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The energy centre (216 MWe) will be surrounded by a security fence and a wall c 14m in height providing visual screening and acoustic attenuation. The energy centre contains:

- Gas turbines (16 x 14.2MWe) and associated 16 flue stacks (height 30m from FFL)
- Black start generators (7 x 2.5MVA). Each has a stack 4.97 m above ground level.
- Black start generator transformers (7)
- MV/LV building (3 Storey 13 m)
- 19 Step up transformers (11kV/33kV)
- 2 no. fuel unloading stations (11kV/33kV)
- 6 no back up fuel (HVO) tanks
- 12 Step down transformer bays (33kV/11kV)
- Security hut
- Administration Building
- GNI AGI
- Power truck building
- 16 parking bays

Figure 2.6 provides a 3D view of the Technology park and further visuals.

Figure 2.6 3D View of the Technology Park (Architectural Design Statement)



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The onsite power generation facility incorporates an Open Cycle Gas Turbines (OCGT) designed to provide 203 MWe (at 10°C) to match the capacity of the proposed datacentre demand. The onsite prime power generation facility comprises 16 dual fuel (natural gas and renewable hydrotreated vegetable oil (HVO)), gas turbines (GTs) – 14.2MWe including 2 reserve and associated 16 flue stacks. This dual fuel OCGT technology, is designed to meet flex demand conditions imposed by the grid connection. The onsite power plant will provide support services to the grid thus alleviating constraints on the national grid and allowing greater integration of renewable energy. When necessary, it will be capable of powering the ICT facility as required by the CRU guidelines.

The power generation facility shall be powered from onsite storage of renewable hydrotreated vegetable oil (HVO) from 6 no. 500 m^3 tanks and a Gas networks Ireland (GNI) transmission network connection via the proposed GNI above ground installation (AGI) meter compound and pressure reducing station. A renewable gas entry point (RGEP) is also proposed for the site. The renewable gas entry point shall be delivered via a biomethane network entry facility (BNEF) unit.

Datacentres (ICT Facility)

Data centre facilities are centralised locations for data centre equipment/systems on a large scale. At a typical facility, they offer significant advantages (and economies of scale) over traditional on premises or de-centralised systems.

The primary advantages are:

- Higher reliability and redundancy of systems;
- 24/7 monitoring and maintenance by staff;
- Higher security and protection; and
- Flexibility – ability to increase or decrease requirements at short notice in line with specific business needs

The data storage facility comprises three datacentre buildings (GF 10,363 m^3). The building will be two storey and accommodate data halls, associated electrical and mechanical plant rooms, maintenance and

storage space, ancillary office administration areas, with plant at roof level (Total Area of each is 24,033 $m^{3)}$.

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The three datacentre buildings will be powered from a mix of on-site renewable power generation from the proposed 29 MW solar farm, and a 220kV HV grid connection, which will be subject to a separate future planning application. Back up (emergency power) will also be available from generators fuelled by hydrotreated vegetable oil (HVO) tanks.

In the event of a loss of power supply i.e. temporary grid blackout, back-up generators (60 in total) will be provided to maintain power supply and provide emergency power if required. The generators are designed to automatically activate and provide power pending restoration of mains power. The generators will be powered by HVO rather than diesel to minimise environmental impact. Each datacentre will have 20 no. generators with SCR abatement to ensure protection of air quality. Air modelling has confirmed that flue height will be 25 m and will include SCR abatement to ensure protection of receiving air quality environment.

The required HVO to operate the datacentre back up generators will be supplied by belly tanks (c. capacity $25m^3$ x 20 gensets per building). Total HVO storage will be a maximum of $4500m^3$. Storm drainage from the generator yards is drained through an oil interceptor to treat any accidental leaks. In addition, interceptors are located above and below the attenuation pond i.e. prior to stormwater discharging from the site.

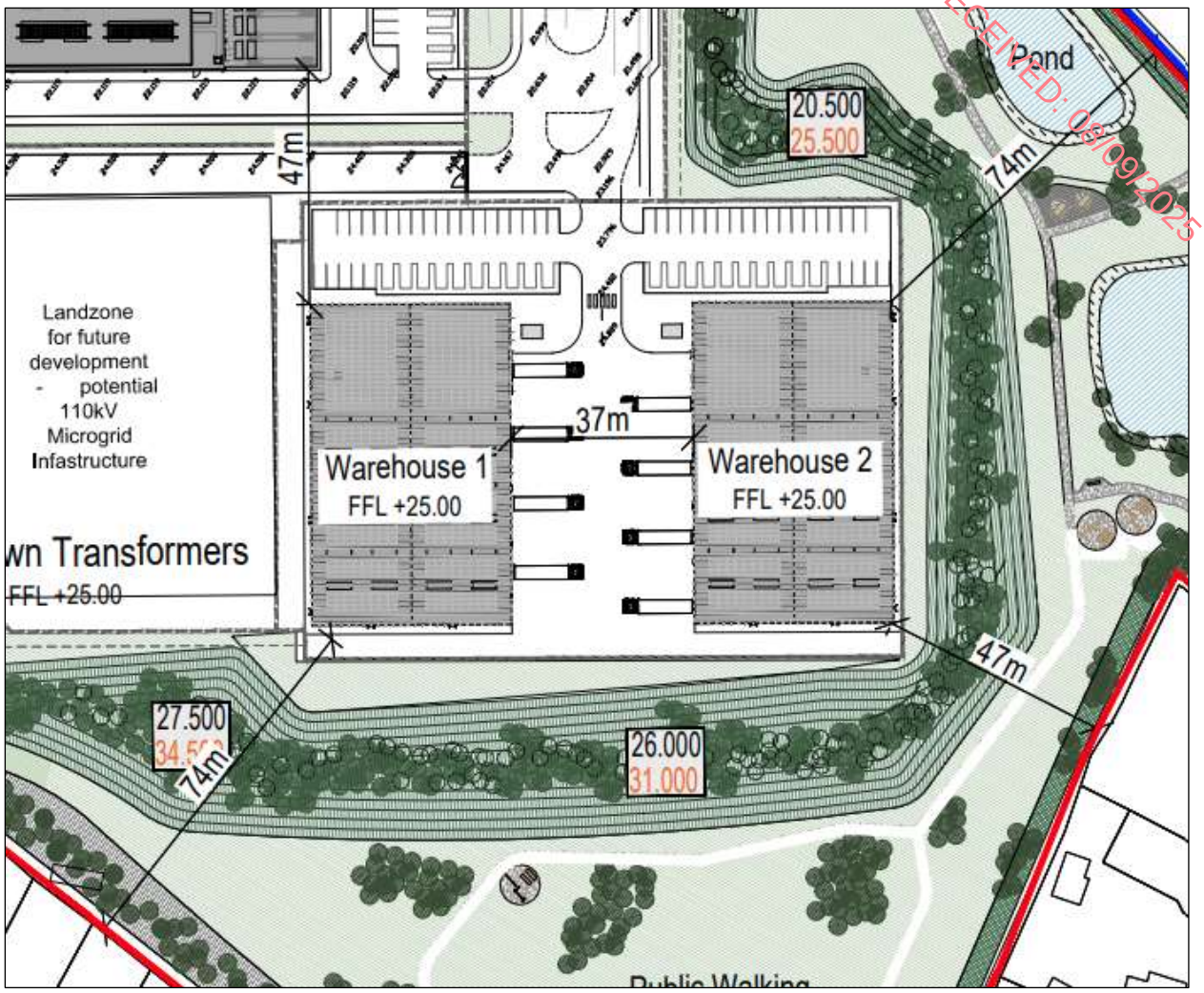
The requirement for cooling at the datacentres is significantly minimised as a result of the prevailing Irish climate. They will have a hybrid cooling systems incorporating Direct to Chip Liquid Cooling and CRAH Cooling. Each building will be equipped with a facility side chilled water system which shall serve the CRAHs in electrical rooms and Direct to Chip Liquid Cooling Distribution Units (CDUs) and CRAH units in the Data Halls. Facility side chilled water shall be generated by 28no. 2000kW free cooling chiller modules (N+2) located on the roof gantry. The ICT facility cooling systems shall operate with a 20°C/30°C flow/return temperature with 25% Ethylene Glycol. The assessed peak cooling load is 52MW per building. This equates to a peak heat rejection load of approx. 156MW from the ICT facilities.

The cooling system within the data halls will be a closed loop water circulatory system with roof chillers forming the primary cooling solution. Closed loop water cooling systems reuses the cooling water, which minimises water usage.

2.4.2 Warehouses

Two warehouses with a gross floor area (GFA) of 2,295 m^2 each are located to the south of the datacentres. These have a separate access off the entrance road to the datacentre development. The warehouses share a loading yard and parking facilities and are shielding from the surrounding residential buildings via large tree lined berms and a green buffer(ref Landscape Design report). Figure 2.7 presents the proposed layout and these are further described in the Architectural design statement (04).

Figure 2.7 Proposed Warehouse Layout (Hyphen Architects, 2025)



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2.4.3 BESS

The BESS will function as a support for the national grid network where there are periods of low energy production. This is located adjacent to the solar park accessed by a separate internal road. The BESS is designed to store 144MW for 3.5 hours autonomy.

The proposed development will comprise:

- Up to 96 No. 5.25 MWh BESS containers measuring 20 ft *x* 8 ft *x* 10 ft (l *x* w *x* h).
- 4 No. Medium Voltage (MV) transformers
- 32 No. power skids
- 4 No. substations (SWG eHouse).
- Supporting elements of plant located within the compound including:
  - An Underground Firefighting Water Tank
  - All the services connections including electrical, potable water and connections to existing surface water drains.
  - External lighting poles, CCTV, lighting monopole.
- Security Fence
- Access

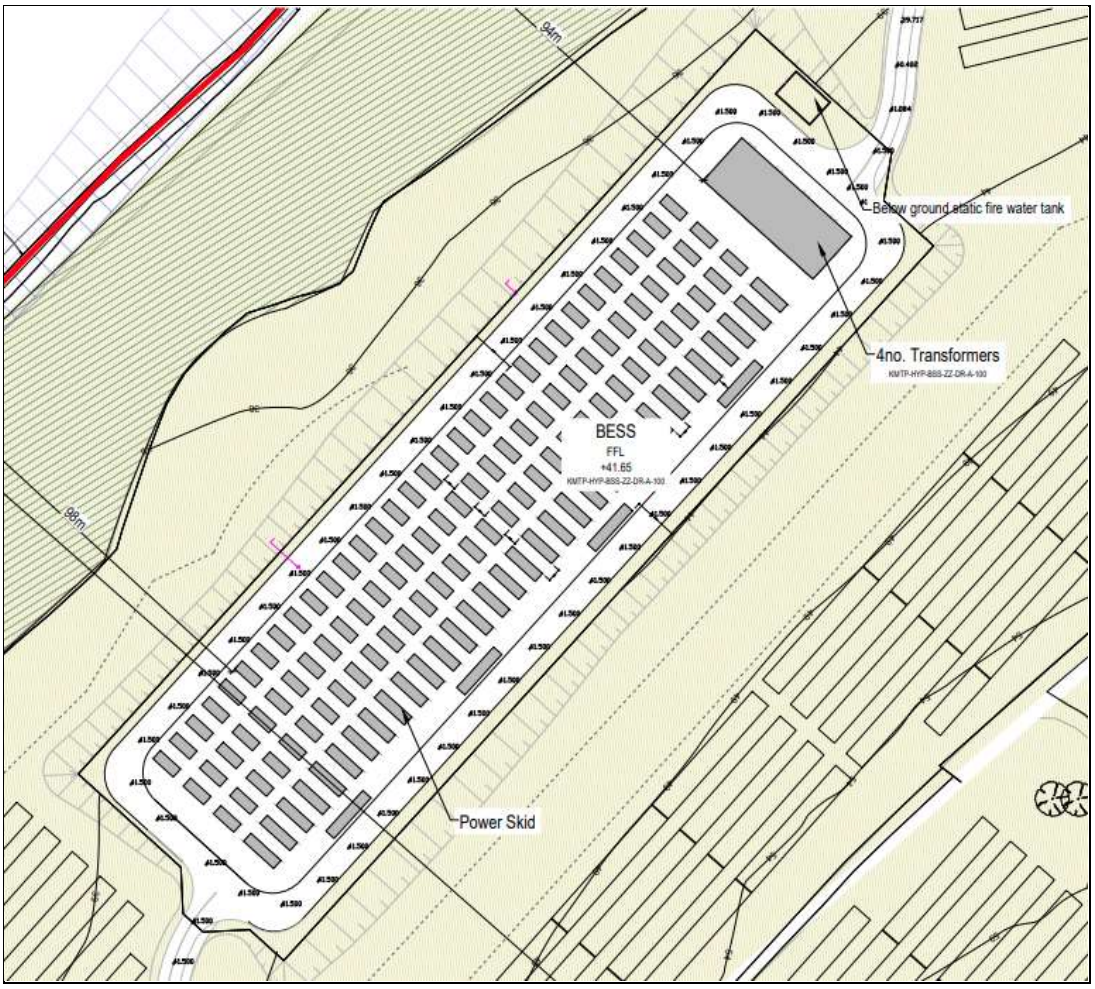
The design will be largely unmanned and monitored remotely, 24/7, from a centralised control centre. Maintenance staff will visit the site intermittently and site access will be granted to authorized personnel

only. All persons present on-site will be required to have an induction which will include the appropriate safety information. Maintenance staff will be suitably qualified and trained in all fire safety procedures.

Existing mature woodland will act as screening to the north and northwest of the facility, providing a visual buffer to residential buildings and Amberhill road. The hilly topography to the south and southwest will shield and views of the facility from this view.

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Figure 2.8 Proposed BESS Layout (KMMP-HYP-ZZ-ZZ-DR-A-0119)



A Fire impact assessment is included in Appendix 2 and concluded that the risk of a fire and harm to persons is low for all scenarios identified.

There is a proposed new access road to the north of the BESS from the local road joining Amberhill road and Carrikadustara road.

2.4.4 Solar Farm

The solar farm consists of 43,056 bifacial Leapton or similar solar panels mounted on metal frames, 3 no transformer stations, new access tracks, CCTV cameras and access gates. The total installed capacity is 29.71MWp. The solar farm and rewilding area will cover c. 78 hectares.

The layout of the solar farm is based on avoidance of any buffer zones; 20 m buffer zones around ponds, riparian buffer, 2-3 m buffer zone around bedrock outcrop, 20 m riparian zone, exclusion zone to existing watermains and landscape/archeological exclusion zones (Ref Figure KMM-HYP-ZZ-ZZ-DR-A-0100).

2.4.5 Village Centre

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The village centre forms a key component of this planning application. The village centre comprises a mixed-use development which includes a medical centre, café, gym, community centre and multi-use games area, crèche, supermarket, small scale commercial units, warehouse and office units, and retired living / residential use with associated open space, roads, footpaths and car parking. The village centre creates a new focal point to Kilmeaden with a pedestrianised square and strong connections to the existing village and surrounding environment. This new focal point for Kilmeaden is outlined in further detail in the Architectural Design Statement (04 The Village Centre).

The masterplan proposes a split level village centre with the northern portion at street level and the southern part elevated to accommodate the site's topography, with accessible routes for people.

The village centre will provide for regeneration of the northern portion of the former factory site as well as services and facilities for the community, in line with the specific objectives for the lands within the Development Plan, its layout intends to extend the public realm and provide linkages with the surrounding area. The updated village centre is shown below.

Figure 2.9 Proposed village centre (Source Architectural Design Statement)



Waste heat from the proposed ICT facilities will be recovered and reused in the new village centre via a district heating system, reducing environmental impact while fostering economic and social benefits for the surrounding community. The proposed ICT facilities will operate on a consistent basis, 24 hours a day throughout the year which will give rise to a consistent source of waste heat. Assuming detailed design of the ICT Facilities is progressed based on provision of 135 MW of IT capacity, a maximum of 505

GWh/annum would be available for export. Further information on the potential for heat recovery and heat reuse is outlined in the Homan O Brien Energy Statement.

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2.4.6 Landscaping

A linear public park stretches along the site between the village centre and the technology park. This includes a new pathway for pedestrians and cyclists – in close proximity (c. 1.6km at its closest point) to the existing Waterford Greenway. The thick hedgerows running along the path will be retained, ensuring habitats are preserved and retaining a vegetated zone along the river. Figure 2.10 taken from the Architectural design statement presents a schematic of the landscaping.

Figure 2.10 Landscaping Schematic (Source: Architectural Design Statement)



The overall design incorporates over 14 hectares of rewilding spaces preserving and enhancing habitats (woodland, meadow and wetland habitats). A riparian zone is maintained along the river. The landscape masterplan is presented in KFLA Drawing 100 and further detailed in the landscape report.

2.4.7 Proposed Site Utilities and Infrastructure

Chapter 6 (Hydrology) Chapter 13 (Traffic and Transportation) and Chapter 14 (Material Assets - Utilities) address the potential impacts of the Proposed Development on the receiving water, wastewater environment, parking and access and availabilities of utilities.

A Pre-Connection Enquiry (PCE) was submitted to UÉ in December 2024 for the water demand for the development (CSS24011093). The Engineering Report includes water and wastewater demand calculations and UÉ correspondence.

2.4.7.1 Proposed Potable water Infrastructure

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A diversion application to relocate the existing watermains away from the development (ref. DIV24393) and to provide a 180mm HDPE watermain catering to the process water demands of the Data Centres and Energy Centre has been submitted to Uisce Éireann (UÉ). It is also proposed to provide a 63mm HDPE watermain catering to the domestic water demand of the overall development.

The potable water supply for the proposed development has been designed in accordance with Irish Water (now UÉ) Code of Practice and Standard Construction Details.

The proposed Technology Park will require potable water for both domestic and industrial usage while the Village centre requires potable water for domestic usage only (Engineering report provides a breakdown of requirement in Table 4-1). The design is based on a potable water requirement for a population of 1950 persons for the Village Centre (average demand 2.204 litres/sec) and 630 persons (average demand 0.614 litres/sec) for the Technology park and warehouses. In addition the industrial requirement (for energy centre and datacentre cooling etc) is an average of 3.966 litres/sec.

2.4.7.2 Proposed Foul Wastewater Infrastructure

The proposed development will have domestic wastewater discharge from staff working in the Technology Park and Village Centre, as well as the residents of the Village Centre. It will also have some process wastewater discharge from the M&E equipment in the Technology Park (daily average discharge of 3.57 litres/second). The design includes a new foul drainage network discharging to the public sewer.

It is proposed to provide separate foul networks for the Technology Park and the Village Centre, to enable monitoring of the wastewater discharge from the Data Centres and Energy Centres separately from the domestic wastewater discharge from the Village Centre.

The entire foul water network will be constructed in accordance with Irish Water Code of Practice and Standard Details.

2.4.7.3 Proposed Surface Water Drainage Infrastructure

The northeast portion of the site contains existing hardstanding areas of the old roads and buildings of the Kilmeaden Cheese Factory. These impermeable areas currently drain to the nearby stream without SUDS systems i.e. do not incorporate attenuation or discharge control for runoff. The rest of the site is currently greenfield and drains to ground and surface run-off to the adjoining river and wetlands.

It is proposed that surface water runoff from the proposed technology park and village centre will be designed in accordance with Sustainable Urban Drainage Systems (SUDS). A riparian corridor will be maintained along the Whelandbridge river and flow will discharge under gravity conditions into the Whelandbridge Tributary at three locations following attenuation and treatment through oil interceptors.

The proposed surface water design is designed incorporating a 20% climate change

2.4.7.4 Utility Supply

The proposed development of ICT facilities will primarily be powered from a mix of on-site renewable power generation from the proposed 29MW solar farm, and a 220kV HV grid connection which will be subject to a separate future planning application.

The onsite energy centre will provide support services to the grid thus alleviating constraints on the national grid and allowing greater integration of renewable energy. When necessary (and as required by CRU requirements), it will be capable of powering the ICT facility.

In addition back up power will be available from emergency generators fed by renewable hydrotreated vegetable oil (HVO) and a proposed Gas networks Ireland (GNI) transmission network connection via the proposed GNI above ground installation (AGI) meter compound and pressure reducing station. The renewable gas entry point shall be delivered via a biomethane network entry facility (BNEF) unit.

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The proposed village centre shall be provided with separate connections to the ESB network to meet power demand. Waste heat from the technology facility will be captured for reuse in the proposed village centre. Waste heat plate heat exchanger within each ICT facility shall remove heat from the facility side chilled water system before it is exhausted to the atmosphere. This waste heat will be distributed to the village centre through a hydraulic flow and return piped water distribution system. The waste heat plate heat exchanger located in each ICT facility building has the ability of recovering 505 GWhs of waste heat / annum which is well in excess of the heat demand for the proposed village centre.

2.4.7.5 Proposed Telecommunications Infrastructure

There are telecommunication lines in existence for telephone and broadband services in the area and fibre provisions for the Proposed Development. The site will be provided with a telecommunications network consisting of separate incoming fibre infrastructure and provided to each building via fibre ducts.

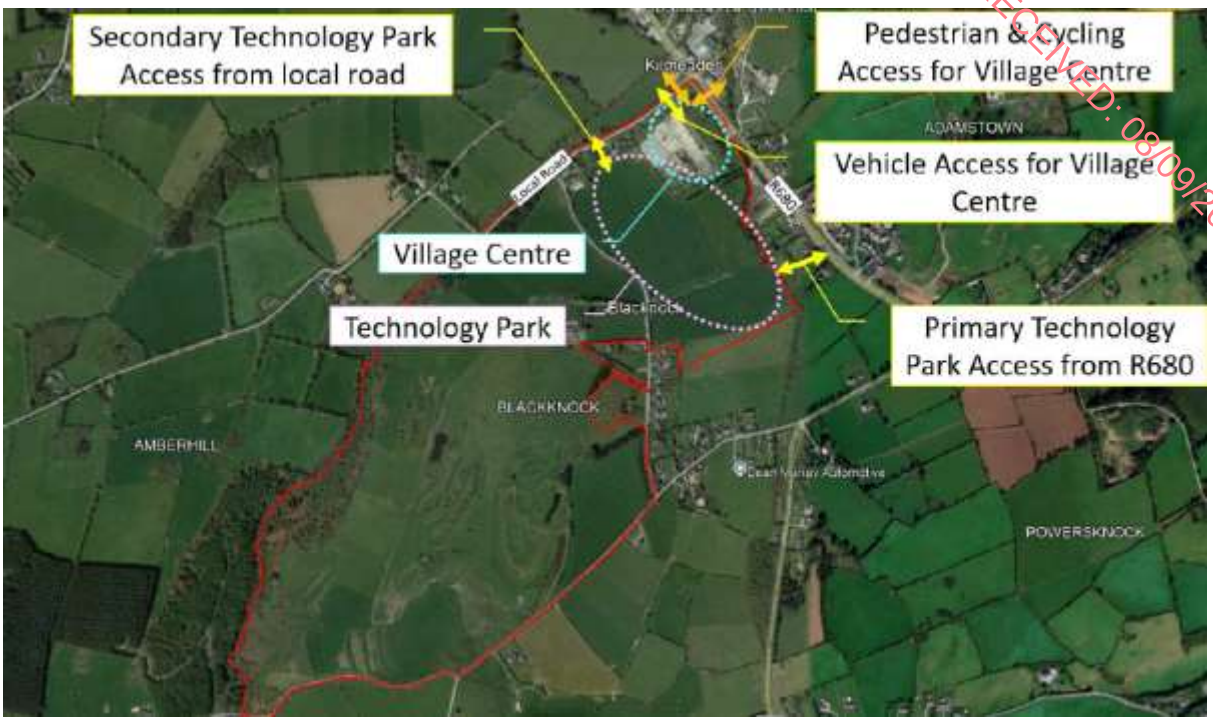
2.4.7.6 Proposed Roads, Access and Parking

The primary vehicular access for the proposed technology park component will be directly from the R680 in the form of a new access point which includes a new bridge crossing. The bridge design spans the river requiring no instream works during construction. As outlined in the Engineering report the bridge will be designed for a 100yr flood event with a minimum of a 300mm freeboard. A secondary access point will also be provided for the Technology Park (in the event of an access difficulty at the main entrance) for the purposes of emergency maintenance and deliveries. Pedestrian and cycling access for the Technology Park will be provided by internal connections from the proposed Village Centre.

The primary vehicular access to the Village Centre will be facilitated via the existing access from the local road. Pedestrian and cycling access will be facilitated via both the local road and R680.

The overall access arrangement is illustrated in Figure 2.11 below.

Figure 2.11 Proposed Vehicular Access points (source AtkinsRealis)



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Full details of the traffic plan, parking and assessment is included in Chapter 13 (Material Assets - Traffic and Transportation).

2.4.8 Proposed Construction Plan

2.4.8.1 Construction Staffing, Working Hours, and Duration

Table 2.2 presents the construction phasing, timing and staffing during construction. It is estimated that there will be a maximum of 750 construction staff at peak construction. Site staff will include; management, engineers, construction crews, supervisors, environment health and safety personal, and maintenance contractors.

Site development and building works will only be carried out between the hours of 07:00 to 19:00 Mondays to Fridays inclusive and between 08:00 and 14:00 hours on Saturdays. However, it is possible that the contractor may wish to carry out certain operations outside these hours i.e. Sunday or evening hours during long summer days etc. Such occurrences will be kept to a minimum and take place over a short timeframe and as such are unlikely to cause excessive disturbance. Deviation from these times will only take place when written approval is granted by WCC in exceptional circumstances.

Once the grant of planning is received, the construction activities on site will commence Q4 with the village centre being completed in Q2 2029 while the technology park will be fully completed by Q 1 2030.

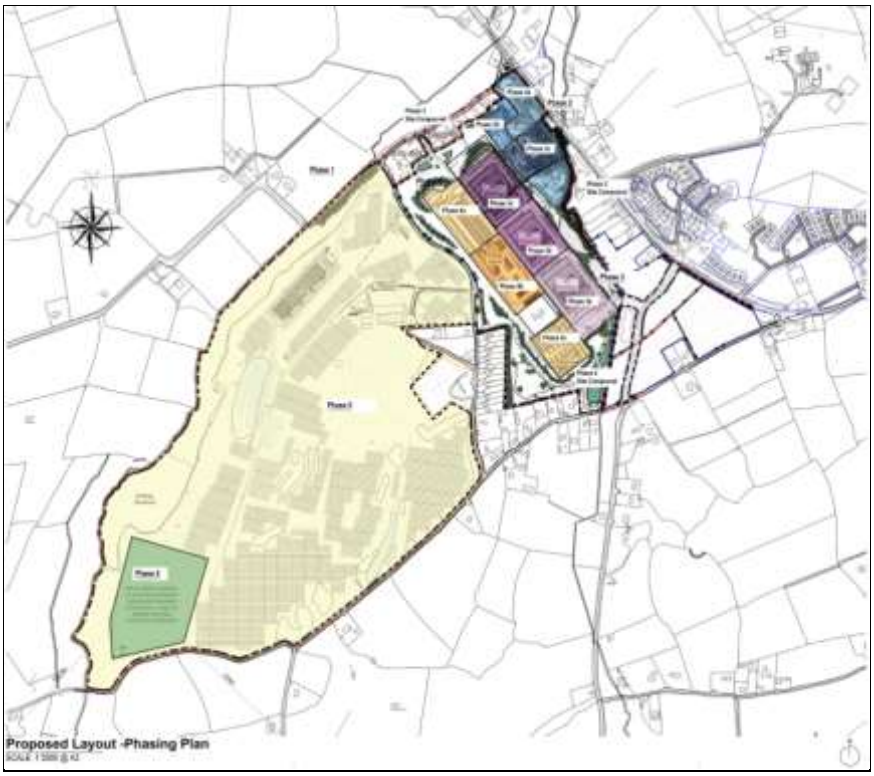
Table 2.2 Construction Phasing, Timelines and number of Construction Workers

Phase	Description	Estimated Start	Estimated End	Construction Duration (months)
1	Enabling works of the entire site inc. cut & fill, access roads, berms, etc	Q2 2026	Q4 2026	4-6 months

Phase	Description	Estimated Start	Estimated End	Construction Duration (months)
2	Village centre	Q4 2026	Q2 2029	24-36 months
3	Data centres	Q4 2026	Q1 2030	39 months
4	Energy centre – construction & commissioning	Q4 2026	Q4 2028	24 months
5	Solar Farm & BESS	Q2 2028	Q1 2029	9 months
6	Substation	Q1 2027	Q1 2029	23 months

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Figure 2.12 Proposed Phasing Plan (KMMP-HYP-ZZ-ZZ-DR-A-0104)



The phasing is further described in the Architectural Design Statement (05)

2.4.8.2 Site Access, Car Parking, and Traffic Management During Construction

Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.

Construction traffic would consist of the following:

- Private vehicles belonging to site construction staff;
- Private vehicles belonging to site security staff;
- Occasional private vehicles belonging to professional staff (i.e. design team, utility companies);
- Excavation plant and dumper trucks used for site development works

The construction of the proposed development is predicted to result in an additional 500 cars and 120 Heavy Goods Vehicles per day during the construction phase peak. Since the working hours are between 7 am to 7 pm, the majority of the staff will arrive before 7 am and depart after 6 pm. Material delivery will be restricted to the off-peak period between 10 am and 4 pm.

The access arrangements and potential traffic safety impacts are considered in Chapter 13 (Material Assets - Traffic and Transportation).

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2.4.8.3 Site Preparation Works and Establishment of Construction Services

This work will include; establishing entranceways and haul roads for vehicles, site clearance, vegetation removal, levelling, cutting and filling of various parts of the site; surveying and setting out for structures; setting up of the construction site with fencing, site compounds etc.

Some demolition is required within the former factory site comprising 24,100sq.m (approx.) assuming 0.5m deep across the area gives 12,050cu.m waste. Assuming 2.3t/cu.m (some is concrete some is asphalt) this will result in approx. 27,715t of waste for disposal.

A compound will provide office, portable sanitary facilities, equipment storage, parking etc for contractors for the duration of the works. The construction compound will be fenced off for health and safety reasons so that access is restricted to authorised personnel only. All areas under construction will be fenced for security and safety purposes and temporary lighting supplied, as necessary.

A combination of bulldozer, excavators, trucks and other soil shifting plant will commence the main site clearance and levelling aspects. The west of the proposed development site is classified by the GSI as having '*Moderate*' (M) to '*High*' (H) vulnerability. The western portion of the proposed development site is classified as having '*Extreme*' (E) to '*Rock at or Near Surface or Karst*' in the Blackknock Hill area of the site, where a higher elevation is experienced and bedrock outcrops are recorded. As such some rock breaking will be required.

Excavations and levelling of the site to the necessary foundation base levels for the proposed village centre and technology park will require the excavation of an estimated c. 244,048.477 m^3 of material. The estimated fill is 87,920.791 m^3 with approximately 46,838 m^3 of material needing to be removed and transported off site and c. 109,289 m^3 being reused on site for landscaping and berms.

Following the completion of site clearance and levelling, all structures will require foundations to structural engineer specifications. Building structures will comprise standard structural steel frames.

2.4.8.4 Construction Equipment, Techniques and Materials

The typical construction plant equipment expected to be used during the construction phase is:

- Tracked excavator;
- Tracked dumper or tractor and trailer;
- Articulated and rigid trucks;
- Bulldozers, excavators, backhoes and ancillary equipment;
- Concrete delivery trucks and pumps;
- Scissor, boom and fork lifts,
- Crane, teleporter; and
- Chains / small tools, concrete pump, concrete vibrator

There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road.

A 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

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Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Liquid materials, such as fuels for construction vehicles, will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications) to prevent spillage.

Construction techniques will include mechanical excavation, construction of reinforced concrete foundations, structural steel frame building, mass concrete rising walls, steel roof beams, and composite cladding for external walls. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances. Specialised data centre equipment will be imported.

2.4.8.5 Landscaping and Reinstatement

Once the majority of the construction works are completed the landscaping will be completed in accordance with the specification of the project landscape architect (KFLA) and to the agreement with the local authority. KFLA have provided a landscape plan and strategy for the site which is provided with the planning documentation.

2.4.8.6 Commissioning Works

Once all the equipment and systems are installed, the technology park equipment and solar and battery facility must be commissioned. The commissioning process for the site involves a series of steps to ensure that the plant is functioning properly and is ready to begin operations. The commissioning process typically takes several months to complete and is included in the proposed construction timeline.

The commissioning process includes the testing and inspection of the installed equipment to ensure that it is operating at its design specifications and is meeting performance guarantees. This will include the final preparations for operations, including training of plant personnel and development of operating procedures.

2.4.8.7 Construction and Environmental Management

Atkins Realis have prepared an *Outline Construction Management Plan (CMP)* (2025). This outlines and explains the construction techniques and methodologies which will be implemented during construction of the Proposed Development. The CMP incorporates mitigation measures outlined in the EIA report as they relate to the construction phase. The CMP includes emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. This is an active document which is continuously updated to manage risk during the construction programme.

The CMP will be implemented and adhered to by the Construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

All mitigation measures outlined within this EIAR, and within the CMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

2.4.8.8 Resource Waste Management Plan (RWMP)

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Chapter 15 contains a detailed description of waste management relating to construction of the Proposed Development. A site-specific Resource Waste Management Plan (RWMP) is included as Appendix 15.1 of this EIA Report. This RWMP will be implemented to ensure best practice is followed in the management of waste from the Proposed Development.

2.4.9 Potential Impacts and Mitigation Measures During Construction and Commissioning

The potential for impacts during the construction phase of a project will depend on a range of factors, including the type of construction activity, prevailing environmental conditions, and proximity to sensitive receptors. There are potential short-term nuisances associated with construction activities, such as dust, noise, vibrations, pollution of groundwater or existing drainage. These nuisances can cause disruptions to nearby areas and may be a source of concern for sensitive receptors.

Some construction activity, such as excavation may have a greater potential for causing impacts than others. The potential for impacts will depend on prevailing environmental conditions, such as the amount of rainfall, wind speeds, and wind direction. For example, high winds can increase the amount of dust and debris that is generated during construction, potentially impacting nearby areas. Another important factor considered is the proximity of sensitive receptors to the construction site. Sensitive receptors can include ecologically sensitive habitats, nearby residences, schools, hospitals, or other areas where people may be affected by construction activities. The closer these receptors are to the construction site, the greater the potential for impacts.

The main potential impacts during the construction and commissioning phase which require mitigation are:

- Management of run-off water in terms of silt runoff, potential for construction leaks and temporary dewatering (see Chapter 6 (Hydrogeology and Hydrology) for further information on potential impacts and mitigation measures) and Chapter 7 (Biodiversity);
- Impacts on human beings in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated (see Chapter 8 (Air Quality) for further information);
- Impacts on human beings in terms of nuisances due to plant noise and vibration from equipment (see Chapter 10 (Noise and Vibration) for further information on potential impacts and mitigation measures;
- Effects on the road network (due to construction workers and other staff attending site (see Chapter 13 (Traffic and Transportation) for further information on potential impacts and mitigation measures; and
- The generation of construction waste materials from excavation works and other construction waste (see Chapter 15 (Waste Management) for further information on potential impacts and mitigation measures).

Each specialist chapter of this EIA Report has assessed the construction activity, prevailing environmental conditions, and proximity to sensitive receptors to determine the likely significant effects on the environment and have proposed mitigation measures (where required) to minimise potential impacts and ensure that the project is completed in a safe and environmentally responsible manner.

In order to manage the construction activities, implement and monitor the effectiveness of the mitigation measure set out in this EIAR, the site-specific CMP will be implemented and adhered to by the construction Contractor. The CMP will be reviewed to include any planning conditions that are imposed and updated by the Project Manager, Environmental Manager and Environmental Clerk of Works where relevant and as required if site conditions change. The specific mitigation measures to address potential environmental impacts are presented in each individual EIAR chapter.

2.5 Operation of the Technology Park and Village Centre

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The Technology Park will operate 24 hours a day, 7 days a week. The Data Centre equipment and supporting infrastructure will be monitored by site staff and faults identified and remedied as required. Staff are primarily required onsite for security, ongoing monitoring and maintenance of plant and equipment. The Village centre businesses will have varying hours of operation but residences will be accessible 24 hours a day, 7 days a week.

2.5.1 Employment and Hours of Operation

It is estimated that when the technology park is developed that there will be approximately 100 staff onsite at the datacentres, will operate 24 hours a day, 7 days a week. There are also a variety of employment opportunities associated with the Village Centre, with staffing estimates as followed:

- Community centre – 20 staff
- Retail units – 12 staff
- Café – 5 staff
- Gym – 10 staff
- Health centre – 20 staff
- Pharmacy – 10 staff
- Creche – 30 staff
- Supermarket – 20 staff

There will be a small increase in traffic owing to staff and resident movements to and from the Proposed Development once operational (Chapter 13 Traffic & Transportation). The modelling results indicate that for all analysed junctions, the junctions would continue to operate in stable and efficient flow conditions.

2.5.2 Sustainability and Energy Efficiency

The new village centre aims to be the first new village centre in Ireland to be 100% fossil fuel free. This will be achieved by integrating renewable energy solutions and pioneering waste heat recovery systems, adopting a circular approach to energy efficiency and resource management. Waste heat will be captured for reuse in the proposed village centre.

The Technology Park is committed to running its business in the most environmentally friendly way possible. The proposed development has been designed to take into account these policies with energy efficiency central to the decision-making process, minimising power and water consumption.

An Energy Statement has been prepared by Homan O'Brien Engineers to accompany the planning application to address the relevant sustainability and energy related policies of the WCC Development Plan 2022-2028.

The use of renewable energy generation on site has been maximised. The proposed development includes a solar farm with a targeted capacity of 29MW. Roof mounted solar PV is also proposed to be deployed on the ICT building roofs, warehouse building roofs and where required in the village centre to meet TGD Part L & NZEB requirements.

It is also planned to seek planning permission for a 220 kV substation on the proposed site as part of a separate SID planning application which will also act as the landfall point for an offshore windfarm off the coast of Waterford.

It is expected that data centres will align with the EU Climate Neutral Data Centre Pact energy efficiency and water use targets and set themselves targets to achieve zero carbon electricity use at all hours. System operators will work with large energy users to facilitate accurate hourly emissions reporting, grid carbon

intensity transparency, and allow data centre to optimise computing loads to maximise use of renewables and minimise carbon emissions (as per Action 99 of Climate Action Plan 2021).

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The proposed design has focused on renewable energy, on power usage efficiencies, on advances in cooling technologies, on battery storage development and on alternative energy production methods. The applicant is also engaged in rewilding and afforestation initiatives.

The applicant is aligned with the goals and objectives of the EU Climate Neutral Data Centre Pact and is committed to leading and exceeding the target performance criteria as outlined in the EU Climate Neutral Data Centre Pact.

Prior to the commencement of operation of the development, the applicant will submit for the written agreement of the Planning Authority details of a Corporate Purchase Power Agreement that the developer has entered into which demonstrates that the energy consumed by the development on site is matched by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy.

The applicant's approach aligns with the "Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy" and the National Climate Action Plan, which seeks to achieve 80% of electricity demand from renewable sources by 2030. To meet these objectives, the applicant has submitted Letters of Intent (LOIs) within the planning documentation for Power Purchase Agreements (PPAs) will be executed to provide net additional renewable energy generation capacity that exceeds the power demand of the proposed ICT facility. The executed PPA capacity will take into account the data centres maximum power demand and annual energy consumption and factor in the intermittency of the selected renewable power sources by applying appropriate capacity factors to achieve this.

2.5.3 Potential Impacts During Operation and Mitigation Measures

The potential for impacts during the operation phase of a project will depend on a range of factors, including the operating activities, prevailing environmental conditions, and proximity to sensitive receptors. There are potential nuisances associated with the on-site operational activities, such noise, emission to air, and traffic. These nuisances can cause disruptions to nearby areas and may be a source of concern for sensitive receptors.

The main potential impacts during the operational phase which require design and mitigation are:

- Management of stormwater run-off water by attenuation and SUDs measures to protect water quality and negate off site flooding, see Chapter 6 (Hydrogeology and Hydrology) for further information on potential impacts and mitigation measures);
- A small area of compensation flood storage is provided within the river flood zone for an area of embankment encroachment for the datacentre building.
- Stack heights have been determined by modelling to manage air emissions, see Chapter 8 (Air Quality) for further information potential impacts and mitigation measures;
- Acoustic attenuation solutions will be deployed where required to mitigate potential impacts on human beings in terms of nuisances due to plant noise and vibration from equipment see Chapter 10 (Noise and Vibration) for further information on potential impacts and mitigation measures;
- The embedded design features and landscaping ensure that, for its type, the development would be of appreciably high quality and some visual interest. See Chapter 11 (Landscape and Visual) for further information on potential impacts and mitigation measures incorporated in the landscape design;
- Effects on the road network due to staff and customers attending site, see Chapter 13 (Traffic and Transportation) for further information on potential impacts and mitigation measures; and
- The generation of operational waste materials see Chapter 15 (Waste Management) for further information on potential impacts and mitigation measures.

Each specialist chapter of this EIA Report has assessed the operational activity, prevailing environmental conditions, and proximity to sensitive receptors to determine the likely significant effects on the environment and have proposed mitigation measures (where required) to minimize potential impacts and ensure that the project is completed in a safe and environmentally responsible manner.

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2.6 Decommissioning

It is intended that the proposed development will have a long lifespan. Regular maintenance and upgrading of the facility over time will enable it to continue to meet future demands. Any changes in the future which require planning approval will incur associated environmental impact assessment and mitigation.

Upon closure of the Technology Park, it is anticipated that the facility will be suitable for re-use or sold to a third party as would any other industrial site. All plant and equipment would simply be decommissioned, removed and recycled/disposed as appropriate. The costs associated with the closure of the facility will be met by the Applicant. Closure of the licenced facility would be undertaken in accordance with the EPA licence for the facility. As part of the IED licence required for the facility, a CRAMP will be required for the Technology park and the site decommissioned in accordance with EPA requirements.

The expected operational lifespan for the Solar farm is 30 years. A decommissioning plan is provided in Appendix 2.3.

2.7 Description of Potential Cumulative Developments

As part of the assessment of the impact of the proposed development, account has been taken of relevant related developments that are currently permitted, or under construction within the area surrounding the Proposed Development site. The potential for cumulative impacts arising from these related projects has been addressed within each specialist chapter of this EIA Report (Chapter 4 – 15).

Each specialist has considered the list of relevant planning permissions from the surrounding areas of the Proposed Development presented in Appendix 2.1. and in particular local planning permissions which are presented in Table 2.1 above. The cumulative assessment also considers the planned 110kV substation located within the site boundary.

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Chapter 3 – Alternatives

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3. ALTERNATIVES

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3.1 Introduction

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU), and in Schedule 6 of the Planning and Development Regulations, 2001, as amended ("the Regulations"), which states:

> *A description of the **reasonable alternatives** studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.*

Schedule 6(2)(b) of the Regulations elaborates on this requirement by requiring the following information:

> *(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects;*
>
> *Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects to be presented in the EIAR.*

The EPA's *Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)* – states:

> *The presentation and consideration of the various reasonable alternatives investigated by the developer is an important requirement of the EIA process.*
>
> *The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*

As such, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process.

This chapter provides an outline of the reasonable alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects.

This chapter assesses the evolution of development and the alternatives examined by the Applicant relating to the location, size and scale, and project design and processes of the Proposed Development. This chapter provides a full justification for the Proposed Development and provides a comparison of the environmental effects of each alternative option.

The reasonable alternatives examined throughout the design process are set out as follows:

- Do nothing alternative;
- Alternative project locations;
- Alternative layout, size and scale;

- Alternative processes; and
- Alternative mitigation measures.

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This chapter describes the alternatives that were considered for the Proposed Development, where applicable, under each of these headings and the reasons for the selection of the chosen options, including a comparison of environmental effects.

3.2 Do Nothing Alternative

There is an established statement of need for all the various elements of the Proposed Development in Ireland within a National, regional and local strategic planning context. In the event that the Proposed Development does not proceed, the specific need for renewable energy, energy support infrastructure, IT infrastructure and housing would still exist.

National Planning Framework 2040 (First Revision, 2025)

With respect to the proposed solar farm National Strategic Outcome 8 details as an objective the need to "*r(R)einforce the distribution and transmission network to facilitate planned growth and distribution of a more renewables focused source of energy across the major demand centres.*"

National Strategic Outcome 8 details as an objective the "*r(R)oll-out of the National Smart Grid Plan enabling new connections, grid balancing, energy management and micro grid development*". The proposed 220Kv substation provides key infrastructure as a landfall point for future windfarm development off the south-east coastline, while the proposed OCGT[1] provides critical back-up power to contribute to Ireland's power security and the BESS[2] provides critical renewable energy storage capacity assisting in managing the power supply fluctuations inherent with renewable power.

National Strategic Outcome 6 details as an objective the "*p(P)romotion of Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities.*"

Furthermore the National need for the solar farm and the Technology Park is supported by National Policy Objective 32 which seeks to "*e(E)nhance the competitiveness of rural areas by supporting innovation in rural economic development and enterprise through the diversification of the rural economy into new sectors and services, including ICT-based industries and those addressing climate change and sustainability.*

The Village Centre will provide housing in tandem with new employment opportunities and community support services, satisfying both National Policy Objective 24 "*s(S)upport the sustainable development of rural areas by encouraging growth and arresting decline in areas that have experienced low population growth or decline in recent decades and by managing the growth of areas that are under strong urban influence to avoid over-development, while sustaining vibrant rural communities",* and National Policy Objective 25 which seeks to "*t(T)arget the reversal of rural decline in the core of small towns and villages through sustainable targeted measures that address vacant premises and deliver sustainable reuse and regeneration outcomes".*

Ireland's Enterprise Strategy (2022)

The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022) states that "*Data centres are core digital infrastructure and play an indispensable role in our economy and society. Data centres provide the foundation for all almost all online aspects of our social and work lives, including video calling, messaging and apps, retail, banking, travel, media, and public service delivery such as*

[1] Open Cycle Gas Turbine
[2] Battery Energy Storage System

healthcare and welfare." Data centres are also described as *"critical to Ireland's economic future, and the success of our businesses"*.

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It is also stated that the "*Government has a preference for data centre developments in locations where there is the potential to co-locate a renewable generation facility or advanced storage with the data centre, supported by a CPPA, private wire or other arrangement. Where the combination of technologies at a generation facility is built to match the demand capacity factor (e.g. endeavouring to match the maximum import capacity with export capacity), the same infrastructure may be able to assist both demand customers and generation facilities (wind/solar/battery farm). This would make efficient use of grid investments, reduce curtailment and potentially enable significant decarbonisation of the data centre. The Government also encourages the co-location of downstream value-adding activities that can make use of carbon, excess heat and other outputs from the data centre activity, such as for horticultural activities or district heating schemes*." (emphasis added)

Enterprise 2025 - Renewed

In the Department of Business, Enterprise and Innovation document titled "Enterprise 2025 – Renewed" it is stated that the "*development of data centres contributes to Ireland enterprise policy and regional development goals by supporting a wide range of sectors, driving the demand for talent, enabling the innovation at the core of our economic performance, and demonstrating of Ireland's position as an attractive place to invest. We are aware of some associated challenges which need careful consideration and responses in areas such as renewable energy policy and planning/environmental matters*". The provision of data centre services supported by designated renewable energy and a robust energy support infrastructure will enable the provision of this important enterprise without compromising Ireland's capacity. Similarly the provision of the Village Centre development with housing, work and amenities ensures sustainable and connected planning for the local area.

Electricity Storage Policy Framework (2024)

The Government of Ireland *Electricity Storage Policy Framework for Ireland (2024),* Section 1.4.3 states that *"Efficient and strategic placement of electric storage systems throughout the grid will enable us to reach our Climate Action Plan goal of achieving a System Non-Synchronous Penetration (SNSP) level of 85% by 2025 and 95% by 2030".* The Framework also speaks of the need for *"locationally specific demand flexibility products and electrical storage systems, particularly where the incorporation of these will accommodate the incorporation of greater quantities of renewable energy generation and mitigate connection and supply issues during grid buildout",* and further states that *"these specialist technical requirements are, in the main, best met by electricity storage systems".*

Ireland's Transition to a Low Carbon Energy Future (2015)

Ireland's Transition to a Low Carbon Energy Future (2015-2030) produced by the Government of Ireland references both renewables, energy technologies and the need for energy security in relation to achieving national carbon targets. It includes details around renewable solar energy and energy storage and the deployment of batteries to assist in fulfilling the demands on the national grid.

Shaping our Electricity Future 2021 (2023)

In July 2023, EirGrid published '*Shaping Our Electricity Future (SOEF) Roadmap version 1.1*', which is an update on the previous version published in 2021. The document states that "*battery energy storage (BES) technologies are required in 2030 for: reserve provision, capacity adequacy, to assist with congestion management, and to help manage surplus renewable generation while minimising the amount of renewable generation required to deliver the Government's target*."

Waterford City & County Development Plan 2022

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Within the Waterford City & Council Development Plan 2022-2028 Utility, Energy and Communications Policy Objective UTL 13, WCC seek to "*p(P)romote and encourage the use of renewable energy, and low carbon resources, namely solar photovoltaic, geothermal, heat pumps, district heating, solar thermal, hydro, tidal power, offshore and onshore wind, biomass as well as micro-generation among business, agriculture, education, health, and other sectors*" (emphasis added)

With respect to the OCG turbine, Policy Objective UTL 13 also states that it "*must also be recognised that other sources of electricity generation such as natural gas, particularly renewable and indigenous gas, will continue to have a role to play in the transition to a low carbon economy. As such, renewable energy developments may require support from such sources in times of high energy demand*".

In Appendix 2 of the WCCDP the area of land previously occupied by the Kilmeaden factory has been identified specifically for urban regeneration; "*DO1 It is an objective of the Council to facilitate and encourage the development of new industrial/ enterprise/ employment uses on this site which do not detract from the amenity of the existing village. The lands shall be primarily developed for industrial /employment uses and limited consideration may be given to residential development on the lands fronting onto the R680 Road. The Council shall seek the provision of a new focal point to the village centre and enhancement of the visual appearance of the Main Street. Particular regard to be had to the visual impact when viewed from the R680, permeability through the site and its relationship with the existing village core. A streetscape shall be created along the north-eastern boundary. Any industrial units shall be of a high standard design and finish and any layout shall have due regard to non –compatible adjoining land uses."* The proposed Village Centre and Data Centre fulfil the zoning objectives for this specific landbank.

Waterford City and County Renewable Energy Strategy 2016

Section 7.3 of the WCCC Renewable Energy Strategy 2016-2030 (Appendix 7 of the WCCDP) highlights the need for district heating schemes but identifies that such schemes are typically supported by a reliance on bioenergy which tends to preclude rural areas like Kilmeaden from this environmental benefit. The Proposed Development will deliver district heating to the Proposed Residential element of the proposed Development and will provide capacity for delivery of district heating to the remainder of Kilmeaden subject to infrastructure upgrades.

Section 12.8 of the WCCC Renewable Energy Strategy also identifies that energy storage such as the proposed BESS is critical in supporting renewable energy sources and reducing dependency on fossil fuels.

If the Proposed Development does not proceed, the existing Kilmeaden factory site would remain as an undeveloped brownfield site and the remainder of the site would remain as a greenfield site all of which would result in a neutral impact on the environment.

Therefore, opting for the '*do-nothing*' scenario would be underutilising this strategically positioned site, would not result in the opportunity for the Village Centre and energy infrastructure supports, and would contravene existing plans and policies.

3.3 Alternative Project Locations

As noted in Section 4.13 of the 2018 Guidelines *"some projects may be site specific so the consideration of alternative sites may not be relevant."*

We also refer to the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2017), which states that in some instances alternative locations may not be applicable or available for a specific project which is identified for a specific location.

The location of data centre facilities is selected in order to provide secure, reliable and best performing cloud and potentially AI computing infrastructure. The developer has considered Ireland for this data

centre development due to the geographical advantages resulting in a moderate climate which minimises cooling requirement, and Ireland's capacity for generation of renewable energy, coupled with an educated and technically sophisticated population. This results in less requirement for air conditioning compared to many places in the world resulting in more sustainable development and reduction in noise and air emissions compared to warmer countries.

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Due to power constraints in the greater Dublin area and the proximity to renewable energy sources such as solar farms, the client looked towards Waterford for available land banks. Site selection criteria included; potential for solar energy provision, proximity to power supply, connectivity, a suitable sized land bank, potential for the use of waste heat for district heating, with a preference for brownfield development.

In June 2021 Ireland's Commission for Regulation of Utilities (CRU), the country's energy and water economic utility regulator that oversees EirGrid, released its "*Proposed Direction to the System Operators Related to Data Centre Grid Connection*" document. The CRU's proposal considers three options in managing the growth of data centre power demand – (i) Do nothing, which would ultimately result in rolling blackouts, unacceptable to the CRU; (ii) impose a moratorium on all new data centre connections, which the CRU views as inappropriate; or (iii) put in place specific connection measures that prioritize new data centre power applications based on location, the potential to add power generation and demand flexibility.

The CRU's preferred option is (iii), emphasizing the need to site data centres in areas that aren't seeing the power bottlenecks that are increasingly affecting Greater Dublin, and ideally areas that have a growing supply of (particularly renewable) power generation. The Waterford region very clearly meets both of these criteria, given the lack of major power end users and the growing renewable capacity – Waterford is currently home to c. 215MW renewable energy generation[3], with the proposed solar farm producing an additional 29MW and available battery storage.

Notwithstanding the current amount of renewable energy produced in the county of Waterford it is identified in Table 6.3 of the WCCDP that there are targets to secure a minimum of 125MW additional solar development within the county by 2030, so as to reach the requirements of the Climate Action Plan 2021. Section 6.6 of the WCCDP reiterates that *"it is important in terms of meeting future energy demands, enhancing our energy security and meeting our ever-increasing carbon emission reduction targets that we provide scope and support for new developments within the renewable energy sector i.e. wind, solar, hydro, ocean and bio energy*".

Section 5 of the Waterford City and County Renewable Energy Strategy 2016-2030 states that within Ireland Waterford is in the top 15% in terms of solar resource[4], and has good potential. Figure 3-1 depicts average total annual sunshine hours over 19-hour periods from 1981 to 2010[5] indicating that in National terms the Proposed Site is located within one of the geographical areas with high levels of sunshine days.

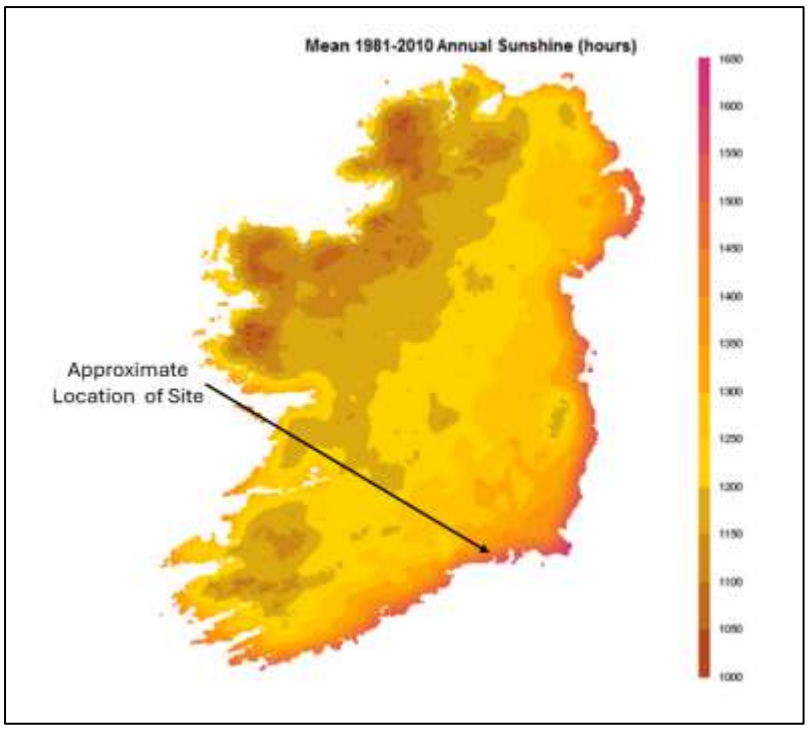
3 Table 6.2 of the Waterford City and County Development Plan 2022-2028

4 Šúri M., Huld T.A., Dunlop E.D. Ossenbrink H.A., 2007. Potential of solar electricity generation in the European Union member states and candidate countries.

5 https://www.met.ie/cms/assets/uploads/2023/08/Mean-1981-2010-Annual-Sunshine-hours.png

Figure 3-1 Total Annual Sunshine Hours[6]

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The current location of the Proposed Development within Kilmeaden was decided by a number of preceding plans, policies and circumstances all of which pre-determined that a location in the vicinity of Kilmeaden offers an ideal project location in terms of planning, sustainability and the environment (section 3.2) and is in accordance with the relevant policies and objectives of the WCCDP.

Within the Kilmeaden area, the Kilmeaden site meets the requirement of the CRU as it is not in a constrained area, as defined by EirGrid. Furthermore, the capacity for the land bank to incorporate 29MW of offset renewable solar power, and a further 216MW of offset power arising from the on-site Energy Centre and energy storage, in addition to the proximity to other nearby solar farms and the landing site for future offshore windfarms makes the site suitable as consumption is located close to current and future generation, alleviating potential transmission constraints.

The landbank chosen is located on, and adjacent to, an existing brownfield site where the data centres and the warehousing and commercial interests associated with the village centre are compatible with the form of employment previously offered at the site.

The Kilmeaden landbank is less than 10km from the Waterford PoP (Point of Presence) hub which has a direct fibre connection to Kilmore Quay, the landing hub for two existing and one soon to be completed subsea fibre cables connecting Ireland to the UK (the Pan European Cable, the SOLAS cable and the Beaufort cable which is scheduled ready for services in 2025[7]).

Regarding the location of the Village Centre General Housing Policy Objective H 01 states it's objective to "*promote compact urban growth through the consolidation and development of new residential units on infill/ brownfield sites and mews and townhouse developments*". Within the town of Kilmeaden there are no other sites that meet the criteria of Objective H 01.

The subject lands have been identified in the WCCDP (refer to Figure 3-2 and Figure 3-3) for further regeneration to include mixed use development with potential residential yield. Objective KLMDO1

6 source Met Eireann

7 https://www.submarinecablemap.com/submarine-cable/azores-fiber-optic-system-afos

elaborates the regeneration vision for the subject lands further supporting the position that for the various attributes of the proposed development that there is no other land bank option. "*It is an objective of the Council to facilitate and encourage the development of new industrial/ enterprise/ employment uses on this site which do not detract from the amenity of the existing village. The lands shall be primarily developed for industrial /employment uses and limited consideration may be given to residential development on the lands fronting onto the R680 Road. The Council shall seek the provision of a new focal point to the village centre and enhancement of the visual appearance of the Main Street. Particular regard to be had to the visual impact when viewed from the R680, permeability through the site and its relationship with the existing village core. A streetscape shall be created along the north-eastern boundary. Any industrial units shall be of a high standard design and finish and any layout shall have due regard to non –compatible adjoining land uses*."

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Figure 3-2 Excerpt from Appendix 21 of WCCDP - Regeneration and Opportunity Sites



The Village Centre and Technology Park are located within lands zoned as "RV – Rural Village", a zoning which, as set out in the WCCDP, seeks to *"Protect and promote the character of the Rural Village and promote a vibrant community appropriate to available physical and community infrastructure."*

The Village Centre features multiple development aspects which facilitate this vision, such as the residential scheme, a health centre, supermarket and community centre. In addition, the Technology Park supports the zoning vision through provision of technology based industry.

"White lands O1", which pertains to the portion of the lands to the southwest, predominately consisting of the proposed solar farm and rewilding area, has no zoning objective. These lands relate to all areas outside zoned and/or designated settlement.

Figure 3-3 WCCDP Zoning and Specific Development Objectives

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3.4 Alternative Layout/Design

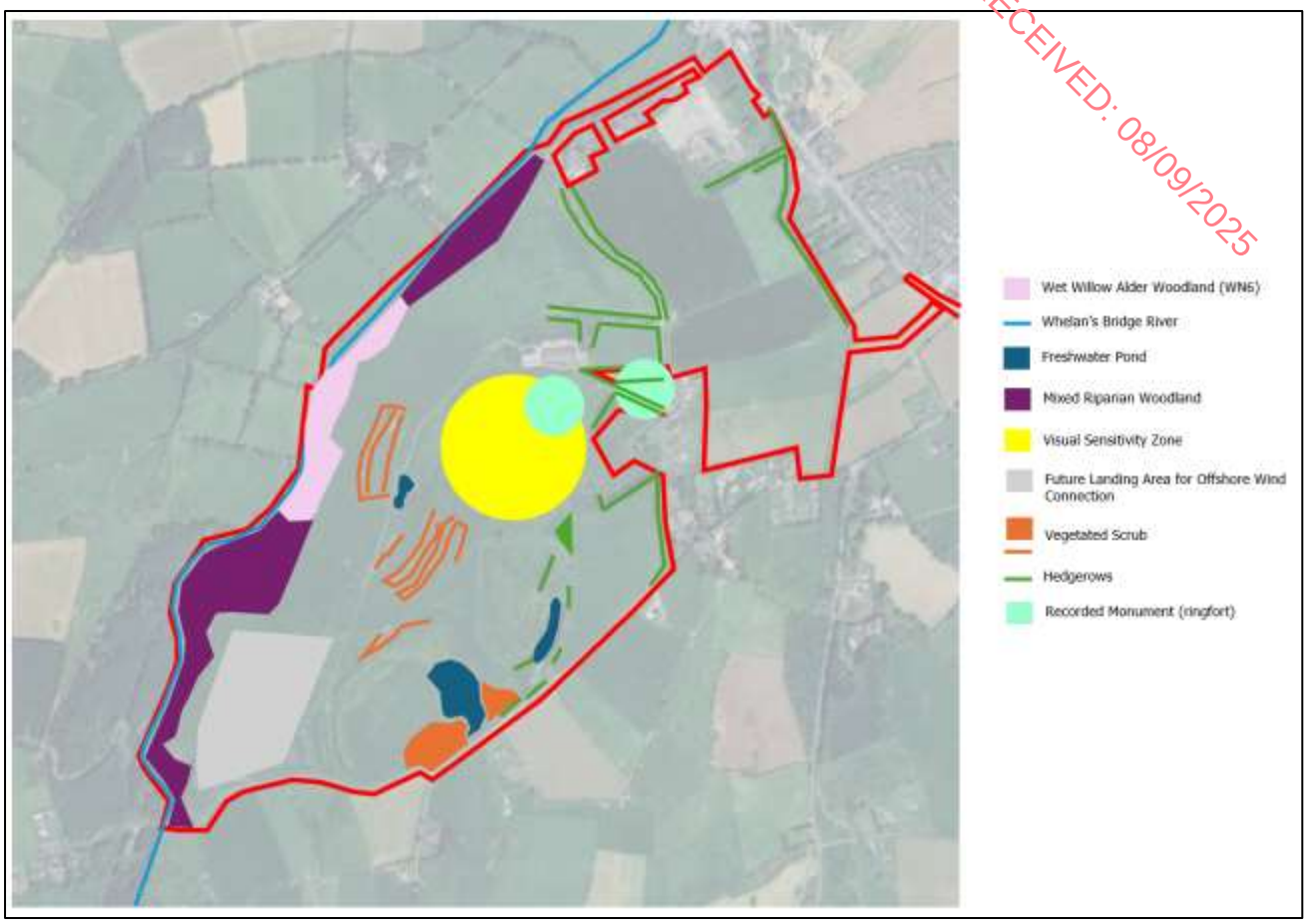
The project design team undertook a comprehensive design process to determine an effective and efficient layout for the Proposed Development, which has regard for the operation requirements, planning requirements and the environmental sensitivities of the site and the surrounding context. This was further informed by two pre-planning meetings with the Planning Department of WCCC on 19th July 2024 and 4th December 2024 (pre-planning reference no. PQ2024237).

The potential for environmental effects which informed this consideration primarily related to visual impact, ecology, land and hydrology, and archaeology. Resulting from initial responses to these environmental aspects Figure 3-4 indicates the remaining land available for the Proposed Development.

Alternative layouts for the Proposed Development were curtailed principally by the need for a Village Centre congruous with the existing main street, topography constraints, adjacent land uses and visual impact, rectangular buildings, pedestrian and traffic flows, and provision/preservation of green open space all of which informed the sitting and layout of the Proposed Development.

Figure 3-4 Initial Areas of Layout Constraint (source Google Maps)

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The design process was an iterative one, which was ultimately driven by the need to provide for a sustainable masterplan that maximised the potential of this strategic landbank while prioritising the regeneration of brownfield areas in a manner that augments Kilmeaden village and its streetscape so as to meet the objectives outlined in Section 3.2. This was also influenced by the following environmental criteria:

- To confine the most "industrial" aspect of the Proposed Development closest to the prior industrial (brownfield) lands without dominating the Kilmeaden streetscape, and to capitalise upon adjacent availability of electricity, foul and potable water sources, and pedestrian access.
- To maximise the positive climate impacts to be gained from reuse of waste heat in district heating by the location of the Data Centres and the Village Centre in close proximity to each other; thus minimizing heat loss in the transfer of this heat.
- To reduce visual impact by confining the bulkiest portions of the Proposed Development to the northern (lower elevation) extents of the site, stepping down the site by berming and tree planting, thereby affording greater opportunity for screening.
- To avoid where possible known archaeological and ecological features and maintain a riparian zone.
- Preserve both native and non-native woodlands associated with Whelan's Bridge River and to restrict, where possible, any construction works that may affect both the Whelan's Bridge River and the freshwater ponds associated with the old factory integrated wetland treatment beds.
- Preserve as far as possible the existing hedgerows both internally and along the boundaries of the site.
- To seek the opportunities to maintain other wooded/scrub areas and to provide further Green Infrastructure (GI) where feasible.
- Reduce the amount of excavation and geotechnical works on site.

Landscape Policy L03 in the Waterford City & County Development Plan 2022-2028 states that there *"will be a presumption against developments which are located on elevated and exposed sites and where the landscape cannot accommodate such development with reasonable and appropriate mitigation"*. As such the existing topography of the site which rises steeply to the south (away from the R680 and the centre of Kilmeaden town) dictated that the only location for the Village Centre, Data Centres, Energy Centre and the Warehousing (the tallest, bulkiest elements of the Proposed Development) should be on lower ground closer to the R680.

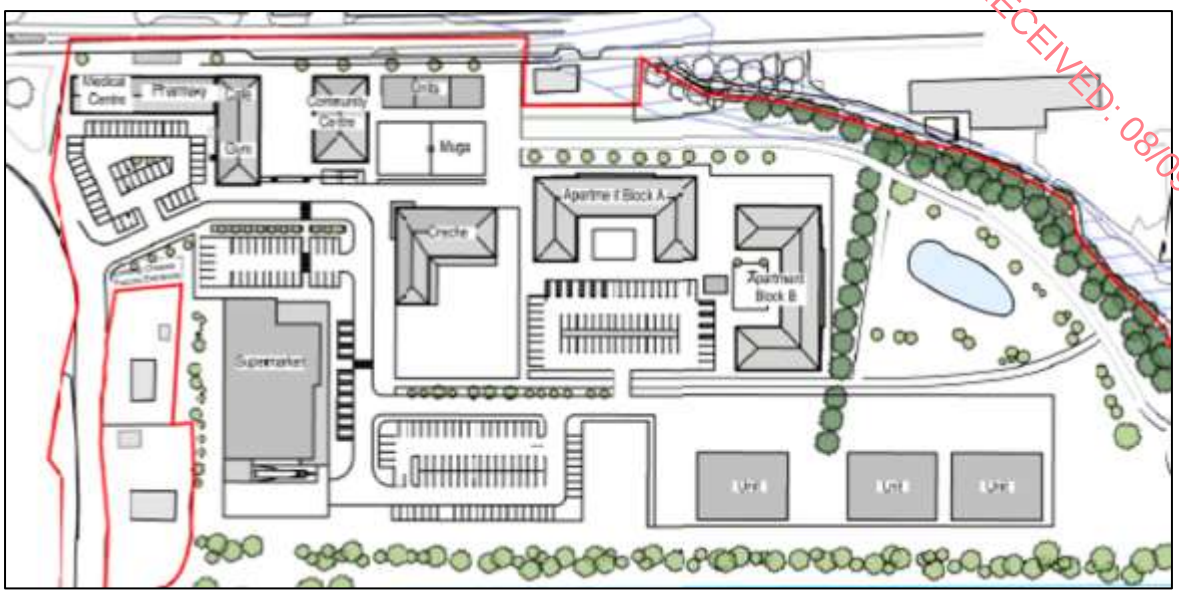
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Designating the northern lower elevation of the landbank as the optimal environmental location for the Village Centre, Energy Centre, Data Centres and Warehousing naturally pushes the less visually intrusive elements such as the BESS and future windfarm connection area further south within the landbank. While avoiding the environmental constraints identified in Figure 3-4, but still with due cognisance to landscape Policy L03 the BESS and the future windfarm connection site have been located in the southern portion of the landbank within areas of relatively lower topography that also benefit from the natural screening provided by existing hedgerows along the unnamed road that bisects the landbank and Blacknock Hill.

With respect to the existing Kilmeaden village streetscape it made sense in terms of visual impact, accessibility for pedestrians and cyclists and reduction of traffic-related air impacts, for the Village Centre to be located at the most northern end of the northern part of the landbank. The layout of the Village Centre was chiefly influenced by the necessity to provide the village-related aspects along the R680, optimise internal traffic flows to reduce air and carbon emissions and to preserve existing hedgerows and vegetation. Hedgerow policy BD 20 of the WCCDP states it is policy to "*protect hedgerows in all new developments, particularly species rich roadside and townland boundary hedgerows, such features should be incorporated into the open space provisions at the concept design stage. There will be a presumption against the removal of hedgerows however where their removal is unavoidable replacement planting shall involve establishment of new hedgerows with native species of local provenance and that support pollinating species*". Figure 3-5 below shows a previous layout option for the Village Centre, while Figure 3-6 shows the current proposed Village Centre layout. The primary changes concerned alterations to the supermarket foot print shape to allow for changes to the parking areas thus facilitating better manoeuvrability for deliveries (less air-related idling time), and also shifted to the east away from the houses to the west. In order to increase green infrastructure open space within the proposal the three commercial units at the rear of the Village Centre were reduced to two units and moved slightly more to the west allowing for the provision of an additional SuDS pond with associated ecological planting.

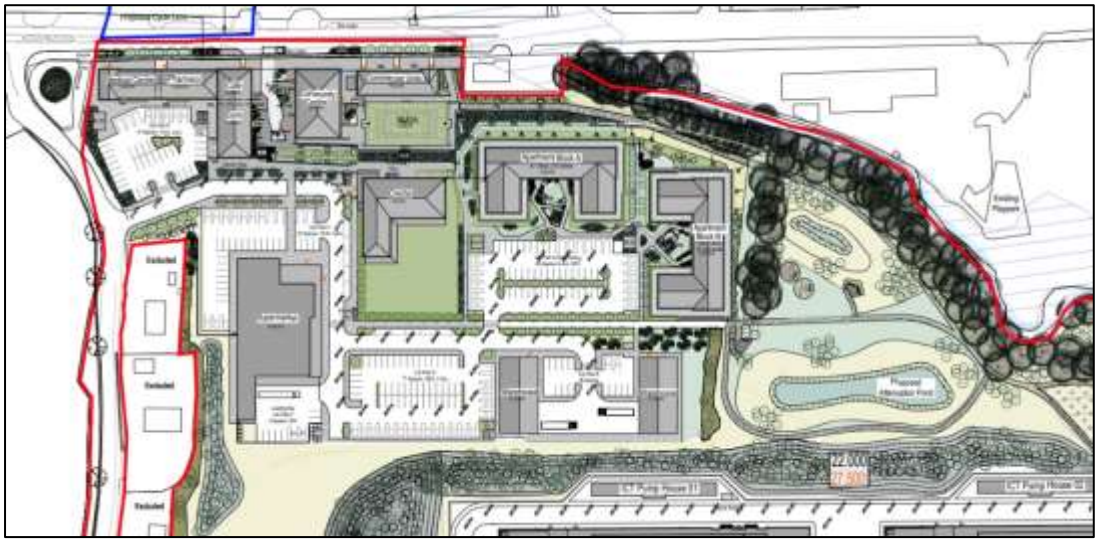
For the remainder of the northern part of the landbank in the early phase of designing the Proposed Development it was assumed that the entire site would be brought to one level; however in response to more detailed site surveys and ensuing engineering cut and fill analysis it became clear that the existing ground conditions and site topography would result in the requirement for considerable ground excavations. Subsurface excavation works can result in increased potential for impacts to surface water from construction-related run-off. The original layout as shown in Figure 3-7 shows the Technology Park (Data Centres and Energy Centre) located on the same plane. This required large volumes of earthworks, so instead the Data Centres and the Energy Centre have been split into two separate planes, with the ground level of the Energy Centre approx. 2.5m higher than the ground level of the Data Centres. Splitting this area into two separate planes imposed a linear layout for the various elements of the Technology Park with the Data Centres on one plane and the Energy Centre and Warehouses on the other plane. In Figure 3-8 it can be seen that it was originally proposed to locate the Energy Centre and Warehouses at the front of the Technology Park, however once the visual impact was assessed from the R680 it was determined that views with the Energy Centre and the warehouses located to the rear of the Data Centres, and the noise screening provided by the Data Centres meant the layout presented in (Figure 3-9) was the preferred option.

Figure 3-5 Alternative Village Centre Layout[8]



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Figure 3-6 Proposed Village Centre Layout[9]



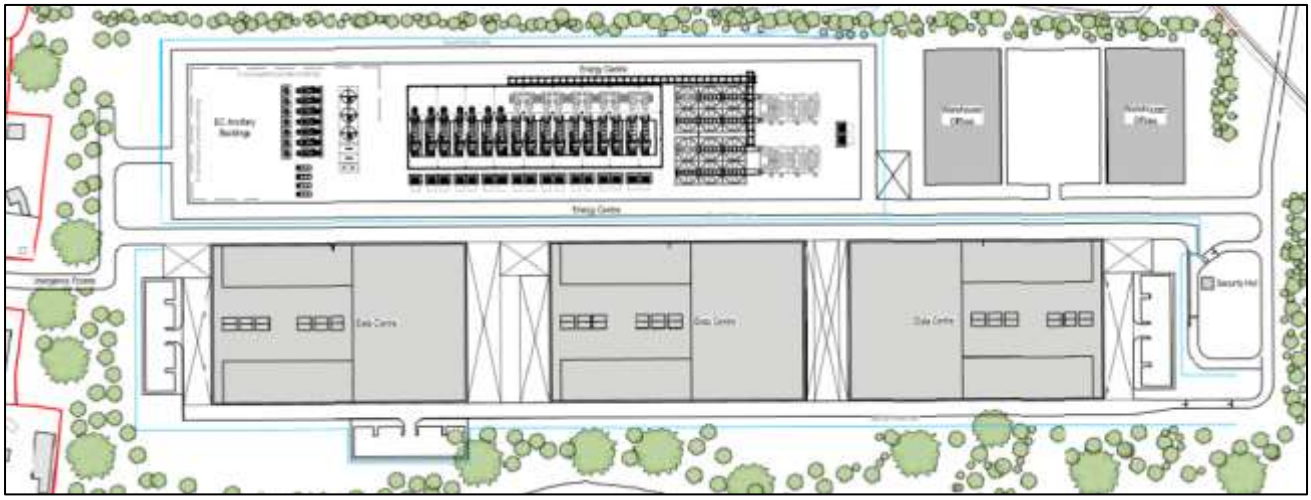
[8] Source: Drawing no. KMMP-HYP-ZZ-ZZ-DR-A-0101 P3 – Issued for Information
[9] Source: Drawing no. KMMP-HYP-ZZ-ZZ-DR-A-0102 P0 – Issued for Planning

Figure 3-7 Alternative Technology Park Layout 1[10]

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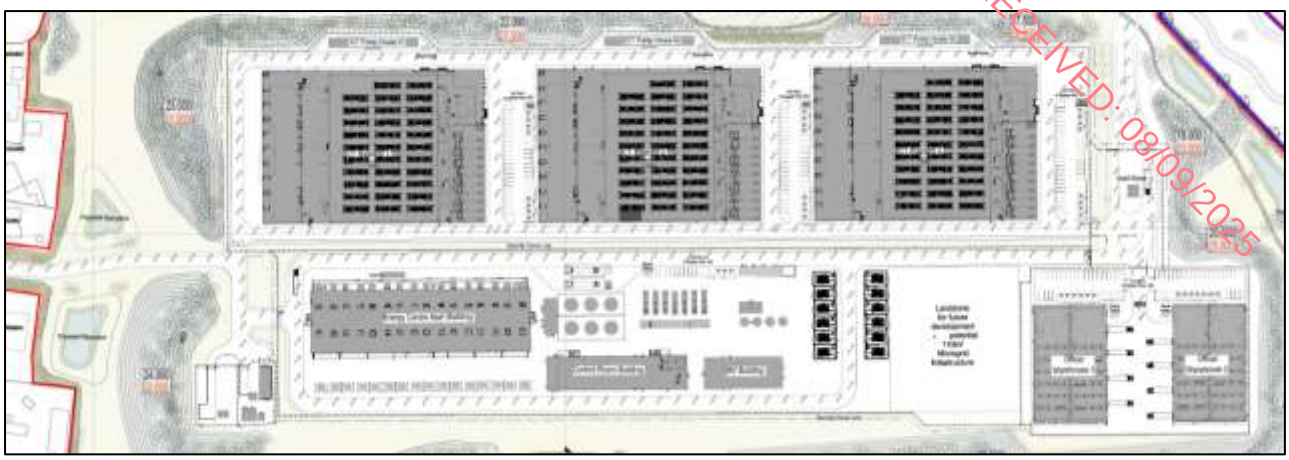


Figure 3-8 Alternative Technology Park Layout 2[8]



[10] Source: Drawing no. KMMP-HYP-ZZ-ZZ-DR-A-100 P2 – Issued for Discussion

Figure 3-9 Proposed Technology Centre Layout[11]



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3.5 Alternative Processes (Technologies)

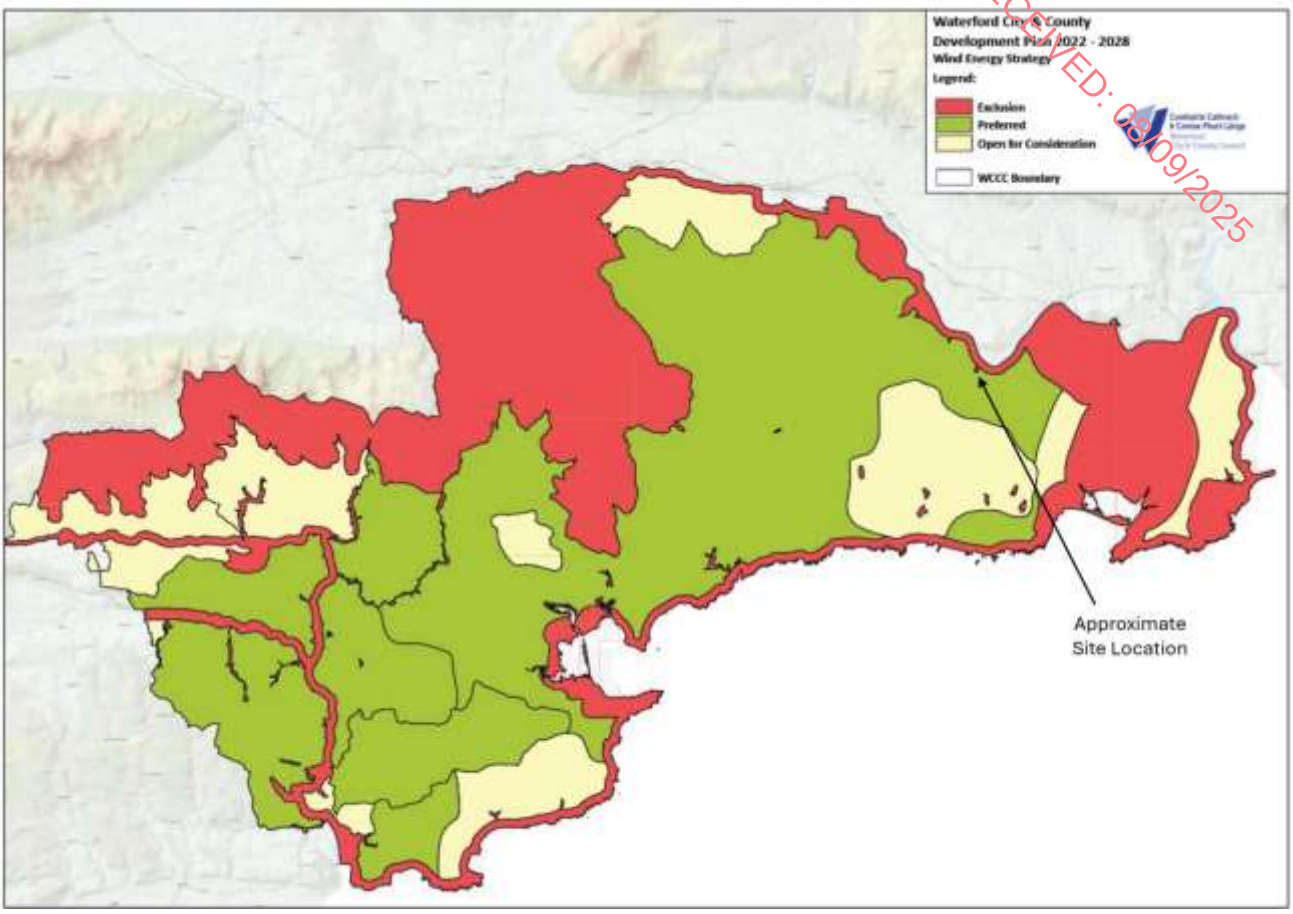
The EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) state that within each design solution there can be a number of different options as to how the processes or activities of the development can be carried out. This section typically examines the project processes in relation to likely emissions to air, noise and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters.

In terms of the Proposed Development processes, the various layout options considered (Section 0) will generally necessitate the same power requirements, and result in the same waste and environmental emissions. The Proposed Development is guided by the applicant's standard specifications, and the flexibility to select alternative processes is limited for this type of development as opposed to an activity that has more complex equipment and processes.

From the outset it was determined that the Proposed Development would need to contain a robust renewable energy component to ensure that the various commercial, residential and community activities could self sufficiently reduce their carbon footprint as far as practically possible. In terms of renewable energy technology of the scale required the two main options would be wind energy or solar energy. While the subject lands are located at the periphery of lands demarked as "preferred" for wind energy under the WCCDP Renewable Energy Strategy (Figure 3-10), more careful scrutiny at site level reveals that the site is in fact not suitable for wind energy.

[11] Source: Drawing no. KMMP-HYP-ZZ-ZZ-DR-A-0101 P0 – Issued for Planning

Figure 3-10 WCCDP Wind Energy Strategy Map[12]



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The primary determinant in the location of a windfarm is the prevailing wind strength. Taking into account the topography of the land (both within the subject lands and in the hinterland), and the turbine siting opportunities within the subject lands there are many complexities as to what a desirable minimum prevailing wind strength should be. An overview of most scenarios commonly found in Ireland in the publication *Community Energy Resource Toolkit Onshore Wind, Sustainable Energy Authority of Ireland, (August 2024*)[13] would indicate that without even considering geographical constraints that a minimum wind strength of 8m/s at hub height would be necessary – '*Open and clear sites with average wind speeds of 8m/s or more at 80m above ground are ideal*.

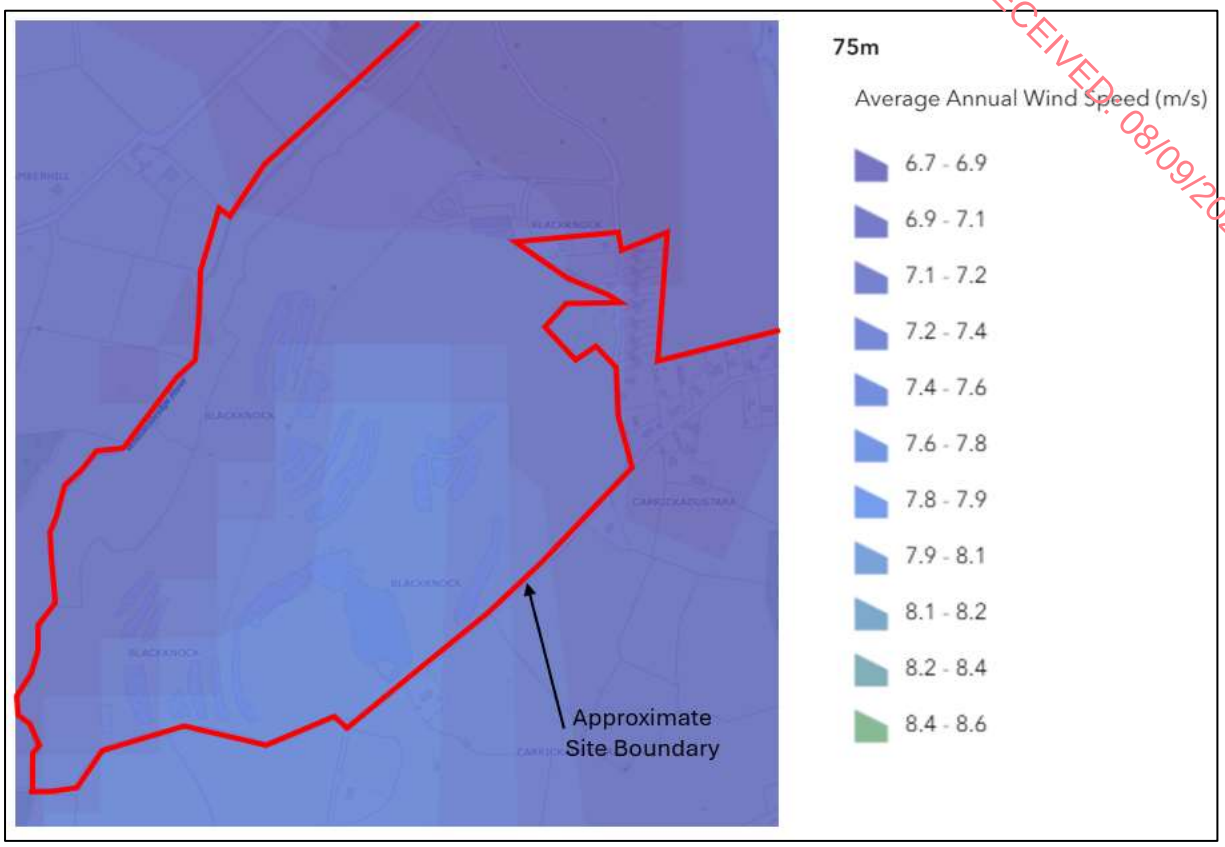
Figure 3-11 depicts data from the Sustainable Energy Authority Ireland (SEAI) GIS database which tracks prevailing winds throughout Ireland at various heights, providing average wind speeds at 75m and 100m for 2001-2010. Figure 3-11 shows that average wind speeds at 75m (the closest parameter to 80m) range from 6.8/6.9m/s to 7.4/7.5m/s, with the highest wind average areas relating to the areas of highest elevation within the site which have been identified in Figure 3-4 to be visually sensitive and where there is a general presumption against visually conspicuous development (Landscape Policy L03[14]). In terms of the provision of renewable energy the site is best suited for solar technology then wind technology.

[12] Waterford City & County Development Renewable Energy Strategy 2016-2030

[13] https://www.seai.ie/sites/default/files/publications/Community-Toolkit-Onshore-Wind.pdf.

[14] Waterford City & County Development Plan 2022-2028.

Figure 3-11 Sustainable Energy Authority Ireland (SEAI) Average Wind Speed at 75m[15]



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An Energy Statement has been prepared by Homan O'Brien Engineers to accompany the planning application to address the relevant sustainability and energy related policies of the WCC Development Plan 2022-2028.

The preferred cooling solution for the Data Centre facilities is a hybrid approach that combines fan wall CRAH (Computer Room Air Handler) units with free cooling chillers and direct-to-chip liquid cooling. The CRAH units are linked to free cooling chillers operating at an elevated chilled water temperature, which significantly extends the availability of free cooling, reducing the reliance on mechanical refrigeration. This elevated water temperature allows the system to take full advantage of ambient conditions, improving overall energy efficiency. In addition, direct-to-chip liquid cooling removes heat at the source, enabling higher thermal efficiencies and reducing fan energy consumption. This hybrid approach optimises cooling performance, minimises energy use, and supports sustainability goals by leveraging free cooling while efficiently managing high-density heat loads.

The use of renewable energy generation on site has been maximized for all areas both residential, industrial and commercial that are intended for human occupancy. The reuse of Data Centre heat presents an opportunity for energy conservation that will be maximised via the use of waste heat plate heat exchanger technology within the Data Centre buildings. The heat plates will remove waste heat from the facility side chilled water system before it is exhausted to the atmosphere, distributing this captured waste heat to the village centre through a hydraulic flow and return piped water distribution system. The proposed technology will facilitate generation of approximately 1000 MWhs of annual energy / peak demand of 1.7MW to sufficiently meet the village centre heat demand.

Under the EU Climate Neutral Data Centre Pact the applicant has successfully completed the first step and is a member of the European Data Centre Association (EUDCA) and has fulfilled its part for the second

[15] https://experience.arcgis.com/experience/adeb20a08bdd477082a3975b3483cce6. Accessed 31 March 2025

step in applying to become an individual signatory of the pact. As detailed in the Homan O'Brien Energy Statement the Data Centre has been designed to both meet and exceed the Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) specified by the EU Climate Neutral Data Centre Pact, and will be matched by 75% renewable energy or hourly carbon-free energy by December 31, 2025 and 100% by December 31, 2030.

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At the outset consideration was given towards Combined Cycle Gas Turbine (CCGT) technology for the Energy Centre as opposed to Open Cycle Gas Turbine (OCGT) technology. Due to the ability to capture waste heat from the turbine exhaust in a CCGT system to generate additional electricity via a steam turbine the overall electrical efficiency of a combined-cycle power system is typically in the range of 50–60% as opposed to a typical 33% energy efficiency associated with an OCGT[16]. However CCGT technology is more suited to, and at its most efficient when utilised in a continuous operation mode. CCGT also requires long start up times, typically 30 minutes to at least several hours before it can be of service, and also before it reaches peak efficiency. The purpose of the Energy Centre is to provide grid support and as such will only operate intermittently and will need to be able to provide a rapid response. Because OCGT operates with a single stage gas turbine this technology can be fully operational within as little as 5 minutes and can also operate and respond to carrying loads very quickly. In light of the better suitability of the OCGT technology for the required purpose OCGT technology is being proposed.

The Energy Centre gas turbines will be dual fuel machines capable of operating with a wide range of liquid and gaseous renewable fuels such as Renewable Hydrotreated Vegetable Oil (HVO) which has been certified under the Renewable Energy Directive (RED III[17]), natural gas, and in the future renewable green hydrogen.

Roof mounted solar PV is also proposed to be deployed on the Data Centre and Warehouse roofs and also in the Village Centre to meet TGD Part L[18] & NZEB[19] (Nearly Zero Energy Building) requirements and objective UTL 01 of the WCCDP. In all instances the residential buildings and the commercial/industrial buildings intended for human occupancy have been designed to meet or exceed TGD Part L and NZEB requirements.

The Proposed Development has also embraced the opportunity to utilise other sustainable measures such as SuDS measures (permeable pavers, grasscrete paving, filter drains, swales, attenuation ponds, integrated wetlands and a hydrobrake) along with significant planting and retention and augmentation of existing ecological features. These measures will attenuate the rate of surface water runoff from the development, intercept first flush flows and improve the quality of water that is intercepted by the surface water drainage network through biodegradation, pollutant adsorption and settlement and retention of solids.

3.6 Alternative Mitigation

The EIA process for the Proposed Development involved a team of specialists, each with expertise in a specific aspect of the environment. For each aspect of the environment, each specialist has considered the existing environment, likely impacts of the Proposed Development and reviewed feasible mitigation measures to identify the most suitable measures appropriate to the environmental setting of the Proposed

[16] Section 12.2.2 Homan O'Brien (2025) Dub 50 Kilmeaden, County Waterford Energy Statement.

[17] Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652

[18] Both the Building Regulations Part L Conservation of Fuel and Energy – Buildings other than Dwellings was released in 2022, and the TGD Part L – Conservation of Fuel and Energy 2022 & nZEB – Dwellings

[19] The European Energy Performance of Buildings Directive Recast (EPBD) requires that all new buildings should be NZEB compliant by 31st December 2020.

Development. In making a decision on the most suitable mitigation measure the specialist has considered relevant guidance and legislation.

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Where relevant, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

The selected mitigation measures for the Proposed Development are outlined in each of the EIAR Chapters 4-15. These measures have been specifically chosen to address the potential environmental impacts of the Proposed Development and to minimise any adverse effects on the environment. By considering a range of mitigation measures and strategies, the specialist team has sought to ensure that the Proposed Development is as environmentally sustainable and responsible as possible.

3.7 Conclusions

Based on the assessment of reasonable alternatives (in relation to location, scale, design, technology, mitigation) relevant to the Proposed Development and its specific characteristics as set out in this chapter, the selected site is considered to be a suitable location for the Proposed Development from an environmental, strategic and planning perspective.

The northern portion of the landbank is currently zoned as RV (Rural Village) which is open to consideration for industrial/technology and acceptable in principle for commercial/residential/community facilities and the southern portion of the landbank is White Lands with renewable energy being open to consideration. The Proposed Development is considered to be in keeping with Specific Development Objective KMD01 of the Waterford City & Council Development Plan 2022-2028.

The siting and layout of the Proposed Development has been carefully selected based on a suitably comprehensive assessment of reasonable alternative site locations, layouts and technologies. The Proposed Development presents minimised environmental impacts, while maximising the strategic potential of the site with respect to reuse of brownfield land, potential for rural village enhancement, potential for power self-sufficiency, and proximity to additional power and fibre connections.

In conclusion it is considered that the proposed site has capacity for development and is highly suitable for the Proposed Development.

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Chapter 4 – Human Health and Population

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4. HUMAN HEALTH AND POPULATION

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4.1 Introduction

This Human Health and Population Impact Assessment has been prepared to assess the likely significant effects on human health population in respect of the Proposed Development.

The EU (2017) *Guidance on the preparation of the Environmental Impact Assessment Report* outlines that human health is a very broad factor that is be highly project dependent. This guidance states:

> *"The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the project, effects caused by changes in disease vectors caused by the project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study."*

Human health should be considered in the context of environmental pathways which may affect health such as air quality, noise, water and soil quality. All can contribute to negative effects on human health by facilitating the transport of contaminants or pollutants. An evaluation of the effects of these pathways on health, by considering the accepted standards of safety in dose, exposure or risk of air quality and noise levels for example, is considered appropriate, as these standards have been arrived at via scientific and medical research.

The EPA (2015) Advice Notes explains that the scope of population and human health is project dependant but should consider significant impacts likely to affect aspects such as: convenience (expanded range of transport options); displaced settlement patterns (residential); employment opportunities; land use patterns; access for tourism, amenity, health impacts and/or nuisance due to noise, dust or water pollution; and health and safety. The EPA Guidelines (2022), notes that the transposing legislation does not require assessment of land-use planning, demographic issues or detailed socioeconomic analysis (EPA, 2022). Furthermore, the EPA Advice Notes (2015) states that issues such as employment, commercial competition, zoning, property prices, agri-business and other social and economic issues are dealt with by more specific instruments (such as the Planning Acts).

Furthermore, in accordance with the EPA (EPA, 2022), the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR. The likely significant impacts on with Human Health and Population in regard to issues such as soils, geology and hydrogeology, water, air quality, noise and vibration, traffic and landscape are addressed in detail within the following EIA chapters:

- Chapter 5 – Land, Soils and Geology;
- Chapter 6 – Hydrology and Hydrogeology;
- Chapter 8 – Air Quality;
- Chapter 10 – Noise and Vibration;
- Chapter 11 – Landscape and Visual Impact; and
- Chapter 13 – Traffic and Transportation.

Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in this Chapter to provide the Planning Authority with a context for their determination.

The assessment of other health and safety issues that are carried out under other EU Directives are also relevant. These may include reports prepared under the Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment, Seveso III, Water Framework Directive, Floods or Nuclear Safety

Directives. In keeping with the requirement of the amended Directive, an EIAR considers the results of such assessments without duplicating them.

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4.2 Methodology

4.2.1 Relevant Legislation and Guidance

This chapter has been prepared in accordance with:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Environment Protection Agency (EPA, 2022)
- Health Impact Assessment Guidance. Institute of Public Health (IPH), (IPH, 2021).
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report European Commission (EU, 2017)
- Advice Notes for Preparing Environmental Impact Statements Draft Environment Protection Agency (EPA, 2015).

This chapter follows these guidelines and will examine the health effects relevant to the Proposed Development as they relate to the relevant study area.

The description of the sensitivity, magnitude and significance, outlined within this assessment are based on the Health Impact Assessment Guidance (IPH, 2021) criteria, while the probability and duration of effects are based on the definitions set out within Section 3.7 of the 'Guidelines on information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

4.2.2 Data Sources of information

The following sources of information have been used in this assessment:

- 2016 Census carried out by the Central Statistics Office (CSO) 24 April 2016. Made available from https://www.cso.ie/en/
- 2022 Census results carried out by the Central Statistics Office (CSO) 03 April 2022. Made available from https://www.cso.ie/en/
- Pobal HP Deprivation Index based on 2016 Census Data (CSO) Made available from https://www.pobal.ie/
- Pobal HP Deprivation Index based on 2022 Census Data (CSO) Made available from https://www.pobal.ie/
- Google maps available from https://www.google.com/maps
- OpenStreetMap and contributors available from https://www.openstreetmap.org
- Health and Safety Authority (HSA) online register of Notified Seveso Establishments available from https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/.

4.2.3 Study Area

There is no specific guidance available on an appropriate study area to focus the assessment of existing land use and/or permitted projects. The research area has been established using expert judgement and based on the accessibility of data and taking into consideration the potential for impact from the Proposed Development.

It is acknowledged that projects like the one proposed can have an impact on activity in a larger area than only the site itself. Generally, the closer to the works, the greater the potential for impacts. The most significant environmental impacts are likely to be confined within 50-150 m of the Proposed Development. Some effects from the Proposed Development, including air quality and traffic, might have a larger area

of effect, and these are addressed in further detail in the corresponding expert assessments that set out the chapters within this EIAR.

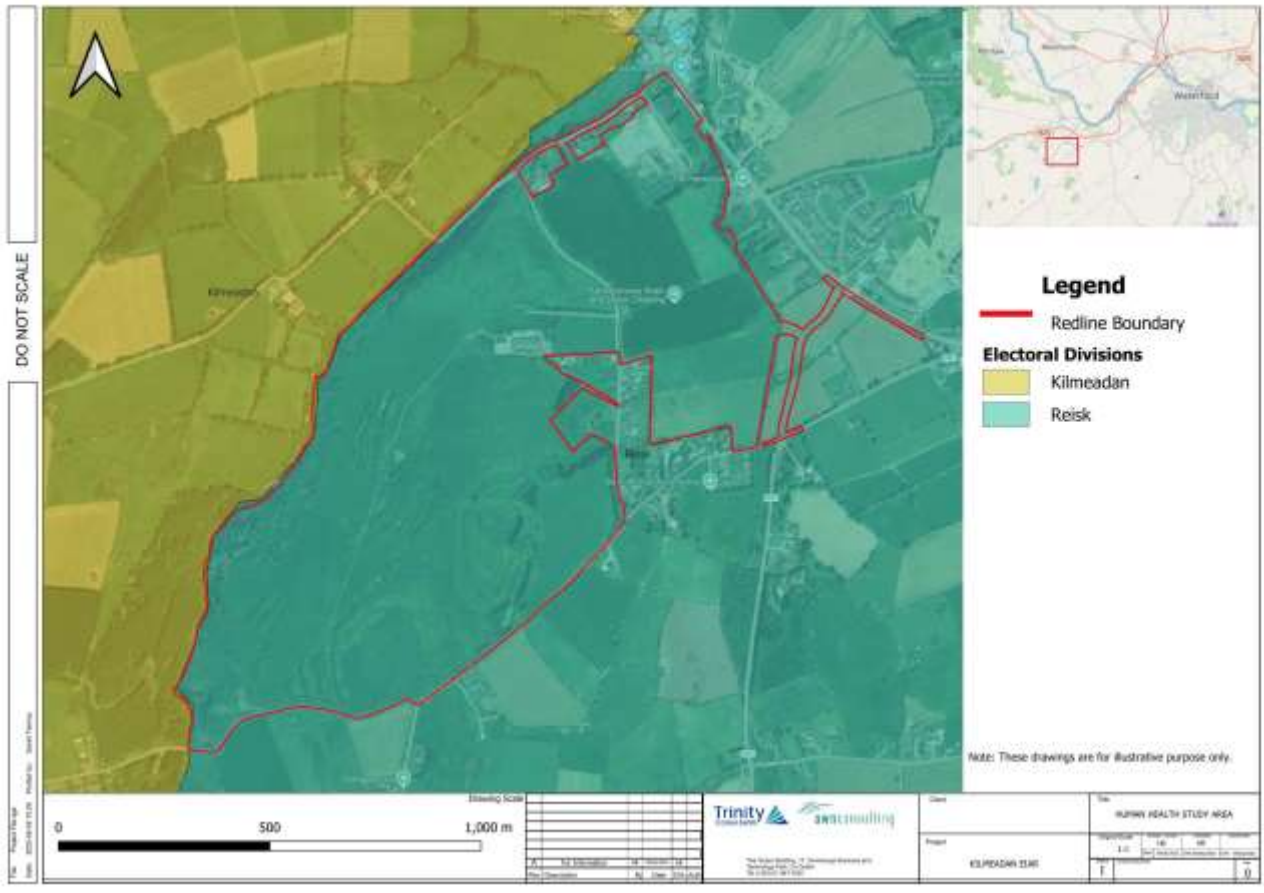
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The project being considered, is not expected to have Regional, National or International, or Transboundary impacts on Human Health. Therefore, the study area has been restricted to the neighbouring community (site-specific population), and wider community (local population). A general study area of 1 km from the site location is included for population statistics, while the wider area of 2.5 km from the site location has been used to inform the baseline description of the area.

In the desk-based assessment of Population Health Sensitivity the use of Electoral Divisions (ED) statistics from CSO have been utilised. Electoral Divisions are the smallest legally defined administrative areas in the state; developed with the intention of producing areas roughly equivalent in both population and "rateable value" (CSO).

The Proposed Development site is located in the Local Authority Area of Waterford City & County Council (WCCC), and in the electoral division (ED) of Reisk and Kilmeaden. The area selected for the assessment of the impact on human health has been defined as the EDs containing the Proposed Development site only. No other EDs are located within the study area of 1 km from the Proposed Development site.

Figure 4-1 Location of the Proposed Development within the Study Area



4.2.4 Population Impact Assessment Categories

4.2.4.1 Assessment Sensitivity of Population

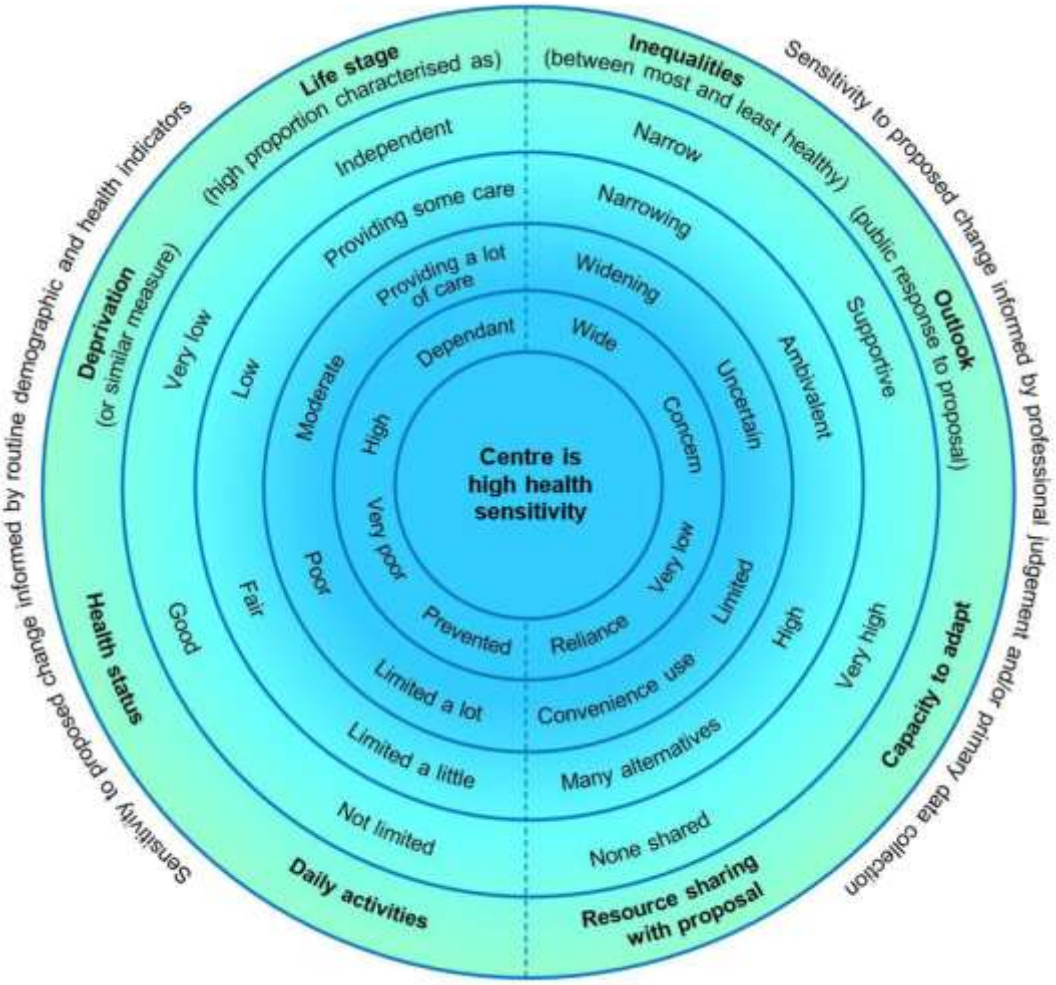
The assessment of significance of an impact is a professional appraisal based on the sensitivity of the receptor and the magnitude of effect. Within any area, the sensitivity of individuals in a population will

vary. The Health Impact Assessment Guidance (IPH, 2021) sets out conceptual model of the different components of sensitivity (Figure 4-2). It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of sensitivity. The conclusion may be summarised as a high, medium, low or negligible sensitivity to change.

The existing sensitivity of the receiving environment (in terms of population and human health) has been appraised for the study area with a desk-based assessment of routine demographic and health indicators, rather than the use of surveys or collection of primary data. This includes analysis of existing data (based on the availably of information) from the Central Statistics Office (CSO) and Pobal to build up a profile of the baseline population information within the study area. Topographical maps and Google maps have also been used to inform the baseline description of the area to inform the proximity of the site to areas of economic activity, employment, community infrastructure, emergency services, tourism and recreation amenities.

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Figure 4-2 Health sensitivity: conceptual model (Source: Health Impact Assessment Guidance (IPH, 2021))



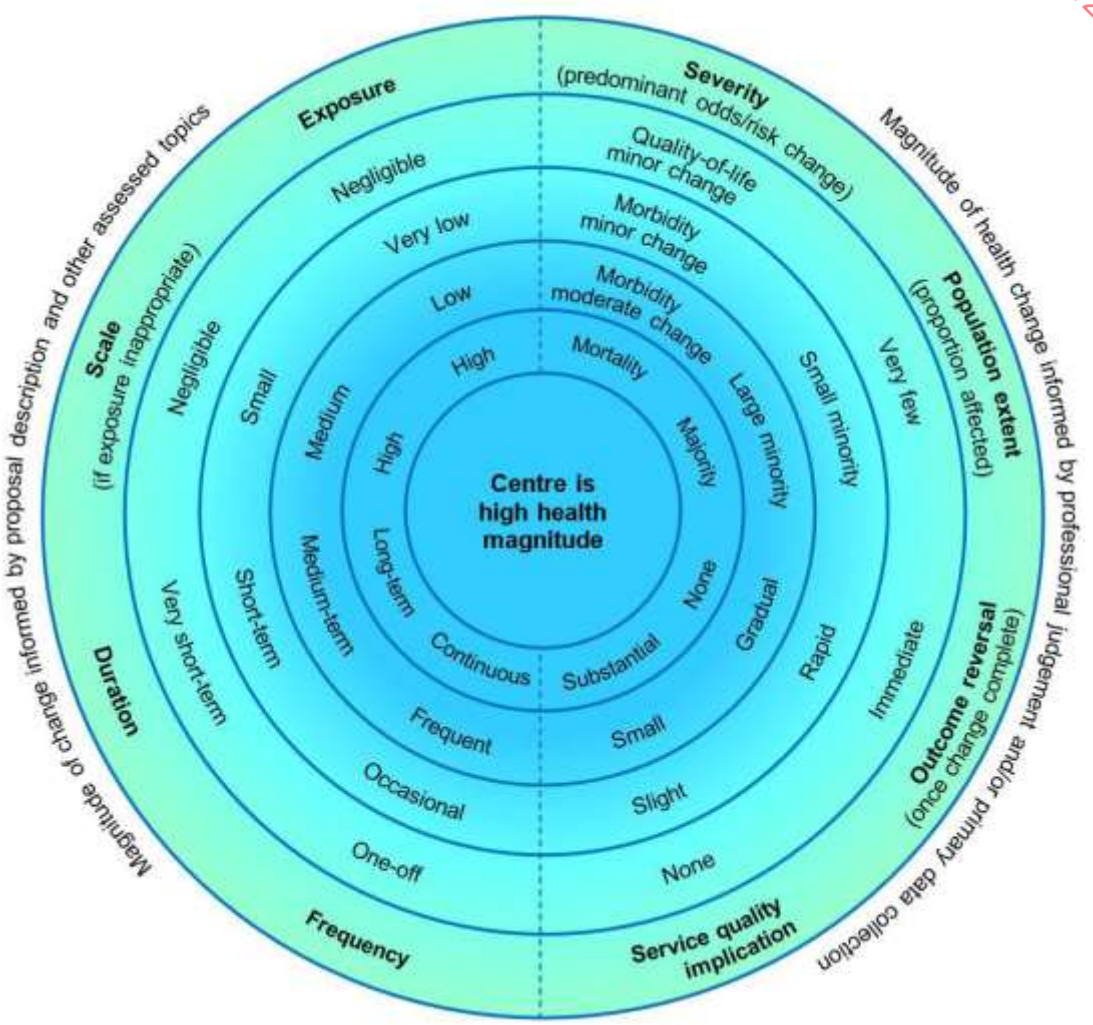
4.2.4.2 Magnitude of Impact

Magnitude considers the characteristics of the change which would affect the receptor as a result of the proposal. The Health Impact Assessment Guidance (IPH, 2021) sets out a conceptual model of the different components of sensitivity (Figure 4-3). Again, this model provides different components of

magnitude. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of *magnitude*. The conclusion may be summarised as a high, medium, low or negligible magnitude of change.

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Figure 4-3 Health magnitude: conceptual model (Source: Health Impact Assessment Guidance (IPH, 2021))



4.2.4.3 Significance of Effects

Significance relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the proposal in question. The assessment of the significance of effects in this assessment is a professional appraisal and has been based on the relationship between the magnitude of the effects and the sensitivity of the receptor.

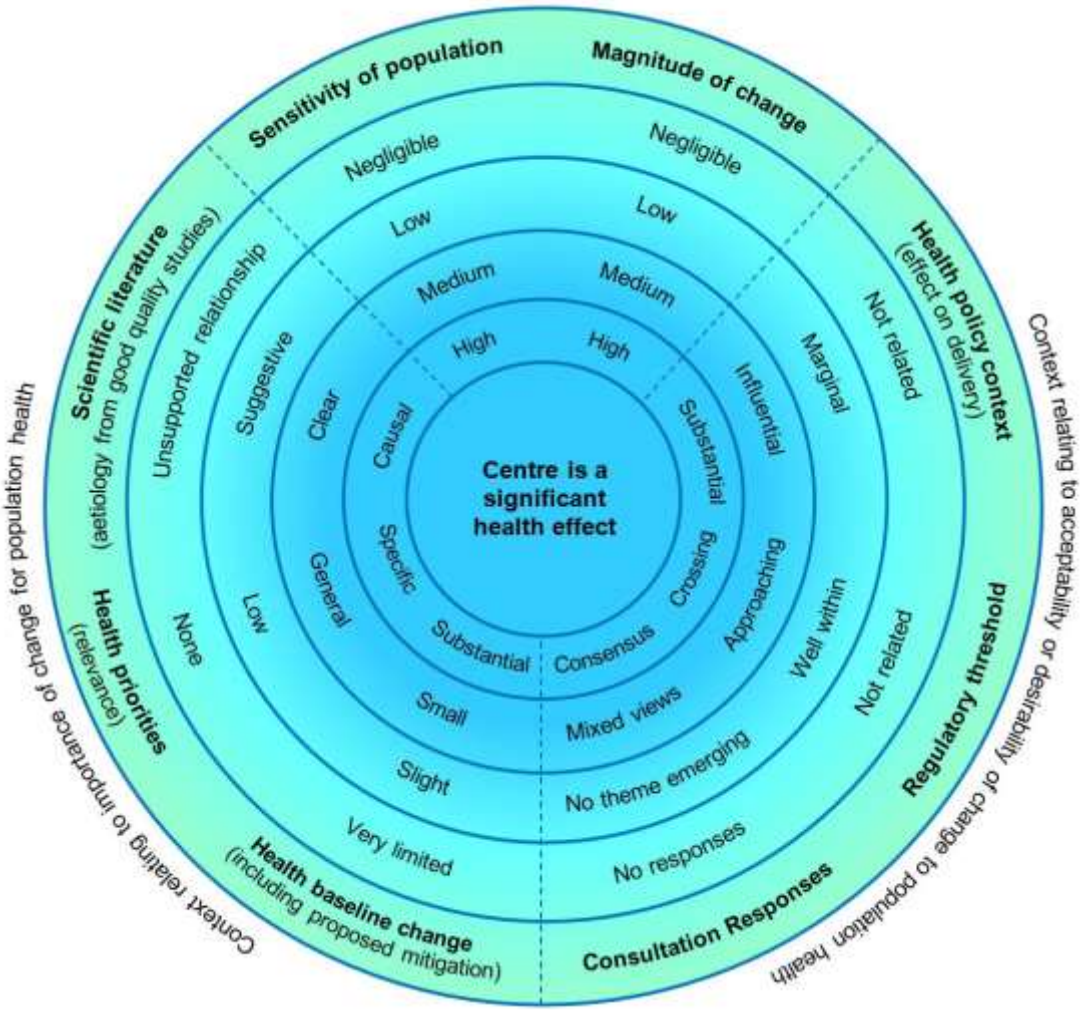
The Health Impact Assessment Guidance (IPH, 2021) sets out a conceptual model of the different components of significance. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding that a health effect is significant or not significant.

The Health Impact Assessment Guidance (IPH, 2021) model brings together different types of evidence, e.g. scientific literature, public health priorities, regulatory standards and health policy. The model thus not only take into account a range of evidence sources, but also a diversity of professional perspectives, e.g. academics, public health practitioners, regulators and policy makers.

The model below, includes the factors of magnitude of impact and the sensitivity of receptors as determined in Section 4.2.1 and Section 4.2.2 above. This EIA assessment typically relies on regulatory thresholds, where there would be formal monitoring by regulators, to set out the acceptability or desirability of change to population health.

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Figure 4-4 Health significance: conceptual model



4.2.5 Forecasting Methods and Difficulties Encountered

No particular difficulties were encountered in preparing the population assessment.

There are uncertainties in relation to assessing impacts on individuals or communities due to the lack of individual health data and the difficulty in predicting effects, which can only be based on general guidance and assumptions.

Forecasting methods and methodology, if any, are set out within the specialist chapters that this assessment relies upon.

4.3 Receiving Environment

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4.3.1 Population Health Sensitivity within the Study Area

The purpose of the population health sensitivity assessment is to identify the likely sensitivity of the local population and its capacity to absorb change. It is considered that for the purpose of this assessment that available data on: Population; Deprivation; Life Stage; and Health Status within the Study Area provides sufficient information to establish the population sensitivity and to provide the Planning Authority with a context for this assessment.

4.3.1.1 Population

The most recent census of population was carried out by the CSO on the 3rd of April 2022. The census compiles data for the whole state as well as smaller individual areas including counties, cities, towns, and electoral divisions. Taking into consideration the location of the Proposed Development, the census information on population, age profile, employment, and social class, has been analysed in relation to the development site.

Table 4-1 denotes the population change of the State and the electoral divisions which make up the study area for the census years 2016 and 2022. The Study Area has seen an overall growth in population with Reisk ED presenting a higher growth percentage when compared to average National rates for the Republic of Ireland (ROI) and Kilmeaden presenting a lower rate than the national average.

Table 4-1 Population Change at National, County and Electoral Division Level from 2016 – 2022 (Source: www.cso.ie)

Area	Population for Census Year		% Change 2016-2022
	2016	2022	
State - Republic of Ireland	4,761,865	5,149,139	+8.1
Reisk	1,144	1,304	+14.0
Kilmeaden	757	778	+2.8

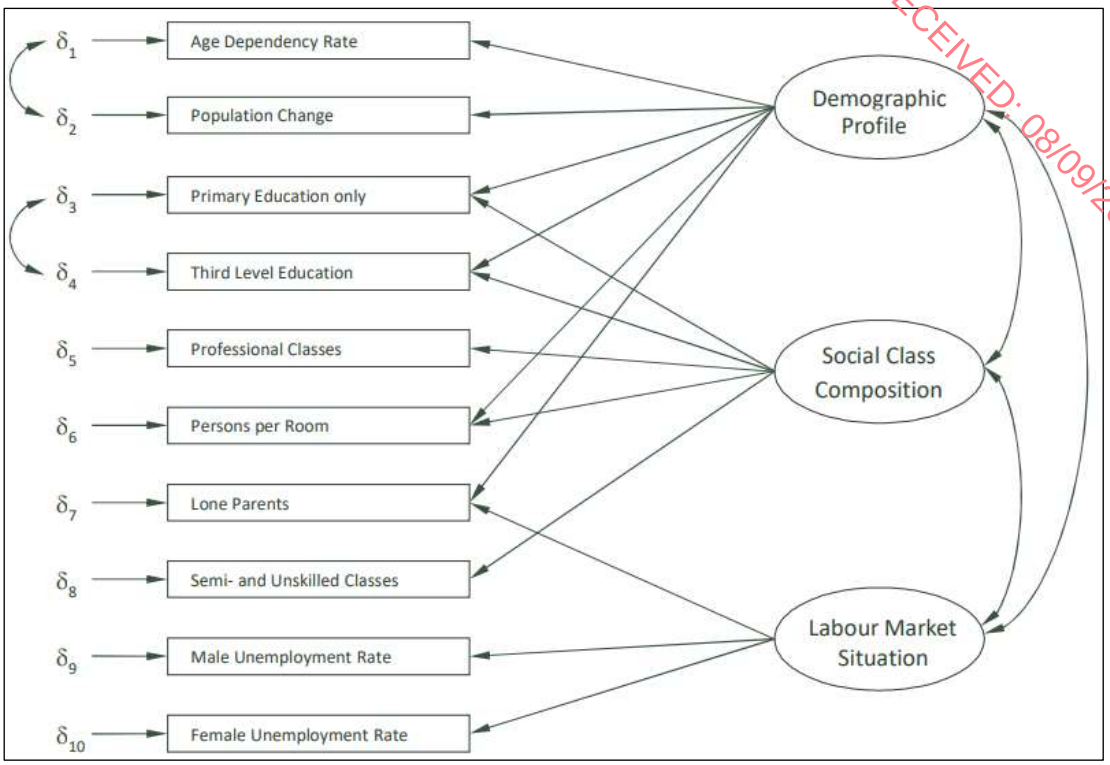
4.3.1.2 Deprivation

The Health Impact Assessment Guidance (IPH, 2021) outlines that impact assessments should consider if the population is already stressed by limited resources or high burdens as well as if groups are affected that have reduced access to financial, social and political resources. Deprivation differences between areas are indicative of social gradients, which are central to the consideration of health inequalities.

Deprivation statistics for Ireland are available from the Pobal HP Deprivation Index that shows the overall affluence and deprivation. This Index draws on data from the national Census and combines three dimensions of relative affluence and deprivation: Demographic Profile, Social Class Composition and Labour Market Situation that are measured by ten key socio-economic indicators from the Census of Population.

Figure 4-5 Basic Model of the Pobal HP Deprivation Index

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The Pobal HP Deprivation Index Relative Index Score allows for the provision of descriptive labels with the scores, which are grouped by standard deviation as seen in Table 4-2 below.

In order to make a uniform assessment using the conceptual model as set out in Figure 4-5 above a relative Population Sensitivity the Deprivation Score of 'Very disadvantaged', or 'Extremely disadvantaged' would represent a high sensitivity. Conversely, a 'Extremely affluent' or 'Very affluent' would represent a very low sensitivity.

Table 4-2 Pobal HP Index Relevant Index Score labels (Source: Pobal HP Deprivation Index)

Deprivation Score	Pobal HP Description	Sensitivity of Population
> 30	Extremely affluent	Very Low
20 to 30	Very affluent	Very Low
10 to 20	Affluent	Low
0 to 10	Marginally above average	Low
0 to -10	Marginally below average	Moderate
-10 to -20	Disadvantaged	Moderate
-20 to -30	Very disadvantaged	High
< -30	Extremely disadvantaged	High

The data in Table 4-3 show the Pobal HP Deprivation Index Relevant Index Scores for the Study Area based on the 2022 Census. These figures show for the year 2022 that within the study area, the EDs of Reisk and Kilmeaden are classified as "Marginally Above Average". This indicates a Lower Population Sensitivity (Deprivation) in most of the study area when compared to County Waterford statistics.

Table 4-3 Deprivation Score within the Study Area (Pobal HP Deprivation Index, 2022 Census)

Area	Deprivation Score	Pobal HP Description
Co. Waterford	-1.22	Marginally Below Average
Reisk	4.12	Marginally Above Average
Kilmeaden	1.77	Marginally Above Average

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4.3.1.3 Life Stage (Age Dependency)

The Health Impact Assessment Guidance (IPH, 2021) outlines that life-course analysis is often used in public health and reflects differing health sensitivities and needs at different ages. Typically, children and older people are particularly sensitive to change, including due to being dependants. Dependents are defined for statistical purposes as people outside the normal working age of 15-64. Dependency ratios are used to give a useful indication of the age structure of a population with young (0-14) and old (65+) shown as a percentage of the population of working age (15-64).

A low dependency ratio indicates that there is a larger proportion of working population age (15–64) years as compared to young (0-14) and old (65+). Conversely, a high dependency ratio indicates that there is a larger proportion of young (0-14) and old (65+) as compared to working population age. High dependency ratio can also indicate if some groups are more likely to be at home during the day (for example, due to childcare, or retired persons) and would therefore be more likely to be impacted by a development within the area.

Age dependency ratio is available through the Pobal Online Geo-Profiling tools (https://maps.pobal.ie/) which are based on the national Census.

The age dependency ratio for the study area is shown in Table 4-4 below. From these dependency ratios we can tell that the study area has increased dependency slightly from 2016 to 2022. However, both EDs are still less dependent when compared with ROI, indicating a mostly 'independent' population within the Study Area. The study area can be defined as per the conceptual model as 'providing some care' to 'providing a lot of care'. This indicates that there is a larger proportion of working population within the Study Area, likely to be out of the home during the day and would therefore be less likely to be impacted by a development within the area as compared to a more dependant population.

Table 4-4 Age Dependency Ratio within the Study Area (Pobal Geo-Profiling, 2022 Census)

Area	Age Dependency Ratio for Census Year (%)	
	2016	2022
State - Republic of Ireland	52.70	53.22
Reisk	35.46	36.66
Kilmeaden	36.07	37.66

4.3.1.4 Health Status (General Health)

The CSO as part of the census records an overall self-reported measure of population health within Ireland. Areas with a poor health status are typically considered to be of a higher sensitivity and more susceptible to change in environmental conditions.

Table 4-5 below shows the self-reported measure of population health within the Study Area compared to ROI. This shows the area predominately self-reports their health as 'Very Good' in-line with national trends and to a slightly higher degree than the ROI average for both EDs.

Table 4-5 Self-reported Measure of Population Health (CSO, 2022 Census)

Area	% population describing their general health					
	Not Stated	Very Bad	Bad	Fair	Good	Very Good
State - Republic of Ireland	6.74%	0.32%	1.41%	8.64%	29.66%	53.23%
Reisk	3.6%	0.15%	1.3%	7.52%	26.76%	60.66%
Kilmeaden	4.37%	0.13%	1.03%	9.9%	28.66%	55.91%

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4.3.1.5 Ability to Perform Daily Activities

People's ability to perform day-to-day activities is relevant to population sensitivity, particularly where there are changes in access to services or community amenities. Persons with disabilities can also be more susceptible to the changes in environmental conditions. The CSO as part of the census records an overall self-reported measure of persons with disabilities within Ireland.

Table 4-6 details the number of persons with a disability compared to the population as a whole. The data shows that the Reisk ED has a lower % of individuals with a disability overall than the national average, while the Kilmeaden ED presents a slightly higher rate of individuals with disabilities when compared to ROI. As Reisk ED has a larger population compared to the Kilmeaden ED, the data indicates that for most of the population within the study area there are relatively limited restrictions on daily activity.

Table 4-6 Persons with a disability (CSO, 2022 Census)

Area	Persons with a disability	Population	% Persons with a disability
State - Republic of Ireland	1,109,557	5,149,139	22%
Reisk	281	1,304	21.5%
Kilmeaden	179	778	23%

4.3.1.6 Summary of Population Health Sensitivity

The sensitivity of the surrounding area has been considered based on the details of the published data available from CSO and Pobal. The Study Area has seen an overall growth in population between 2016 and 2022, with Reisk presenting a higher growth percentage when compared to average National rates. The Pobal HP Deprivation Index shows both EDs being 'Marginally Above Average', and with a lower age dependency ratio when compared to ROI, indicating a greater 'independent' population within the Study Area. The data indicates that the majority of the population on working age, implying a greater degree of self-sufficiency and resilience to change.

The information available for the study area shows that a large proportion of the population (55.91% to 60.66%) describes their health status as 'Very Good' and a small proportion (0.13% to 1.3%) as 'Bad' or 'Very Bad'. The data shows that Reisk ED has a lower % of the population with a disability than the national average, and Kilmeaden a higher percentage when compared to ROI; As Reisk ED has a larger population compared to the Kilmeaden ED, the data indicates that for most of the population within the study area there are relatively limited restrictions on daily activity.

Taking these factors into consideration, it can be concluded that the population in the study area exhibits a relatively low sensitivity to change, categorising it with regard to the criteria set out in Figure 4.2 as having a Low population sensitivity.

4.3.2 Location and Character of the Local Environment

The purpose of describing the location and character of the local environment provides useful information on the current local community and usage within the study area provide the Planning Authority with a context for this assessment. This includes community and social infrastructure that covers a range of

services and facilities that meet local and strategic needs and contribute towards a good quality of life. In this context it includes local business, residential areas, education, health facilities, emergency services, and places of worship, and green infrastructure.

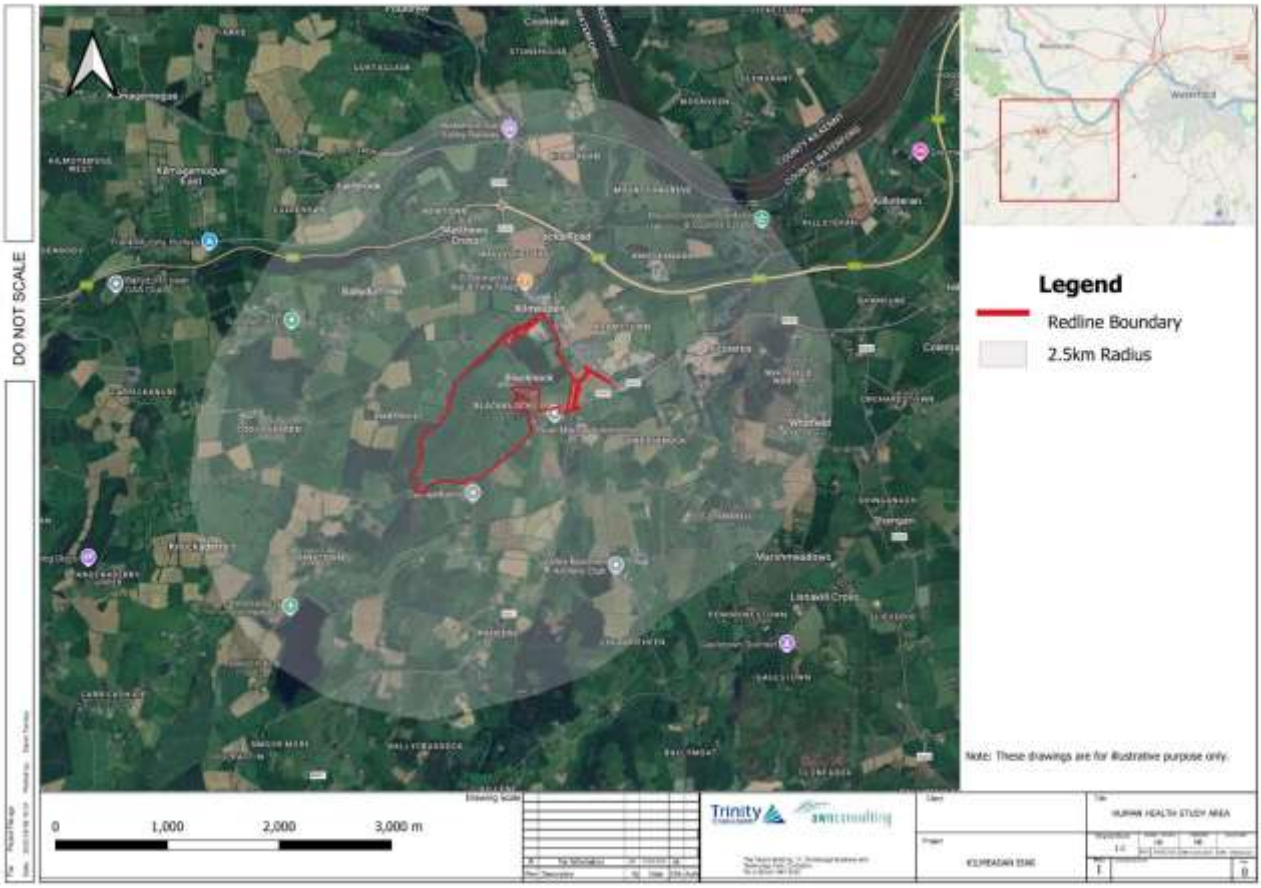
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Furthermore, the baseline identifies tourism and landscape amenity within the study Area which provides an indication on current intrinsic values placed on the area for local, national and international users that may be impacted by the Proposed Development.

The local environment also includes areas of natural resources that relate to populations and human health that may be impacted by the Proposed Development, this includes economic resources, recreational and bathing waters, and drinking water resources.

While a general study area of ED's within 1 km from the site location is included for population statistics, the wider area of 2.5 km from the site location has been used to inform the baseline description of the area. Refer to Figure 4-6 for baseline area map.

Figure 4-6 2.5km Radius Baseline Description Area



4.3.2.1 Community and Social Infrastructure within the Study Area

4.3.2.1.1 Residential and Employment areas

At its northern portion the site boundary partially located within land designated under the zoning category "RV - Rural Village" under the Waterford City & County Development Plan 2022 – 2028, with objective of:

> *"Protect and promote the character of the Rural Village and promote a vibrant community appropriate to available physical and community infrastructure".*

The northern portion of the site at the Kilmeaden settlement is also characterized by the Objective No. DO1, which comprises:

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> *"DO1 It is an objective of the Council to facilitate and encourage the development of new industrial/ enterprise/ employment uses on this site which do not detract from the amenity of the existing village. The lands shall be primarily developed for industrial /employment uses and limited consideration may be given to residential development on the lands fronting onto the R680 Road. The Council shall seek the provision of a new focal point to the village centre and enhancement of the visual appearance of the Main Street. Particular regard to be had to the visual impact when viewed from the R680, permeability through the site and its relationship with the existing village core. A streetscape shall be created along the north-eastern boundary. Any industrial units shall be of a high standard design and finish and any layout shall have due regard to non –compatible adjoining land uses."*

The Waterford City & County Development Plan 2022 – 2028 do not include the lands to the south of the "RV - Rural Village" zoning in any zoning category.

The Proposed Development site surroundings are characterized by extensive agricultural lands with a few small residential settlements. There are no large industries within the study area and there are only a small number of commercial businesses and warehouses of industrial typology within 2.5km from the Proposed Development. The closest large industrial facilities to the Proposed Development are located in Waterford city, c. 6.5km northeast. The existing commercial a facilities within the study area and their distances from Proposed Development site boundary are:

- Centra Kilmeaden – Immediately to the north
- Zambak Fish & Chips – Immediately to the north
- The honeycomb (hairdresser) – Immediately to the north
- Guiry Estate Agents – Immediately to the north
- Mountain View Chinese Restaurant – Immediately to the north
- The Village Hair Design – Immediately to the north
- Moon Café – Immediately to the north
- Tirlán CountryLife Kilmeaden – 80m north
- Hennessy's Garage (Mechanic) – 80m north
- Keegan Carpentry & Joinery – 130m north
- Swift Oil - Gala Kilmeaden (gas station) – 160m northwest
- Sky Car Wash – 160m northwest
- O'Donnacha's Bar & Fine Food – 230 m northwest
- Mary Harrington Architects – 1.4km north
- Living Colours (florist) – 1.5km northwest
- Frank Murphy Hurleys (sporting goods store) – 2.3km northwest
- CW Clothing – 1.5km east
- Orchardstown Garden Centre – 2.3km east
- South East Powder Coating - 2.2km east
- Dean Murray Automotive (mechanic) – 230m east
- Waterford Car Rental - CARHIRE.ie – 120m east
- The Sweep Bar (restaurant) – 140m east
- The Book Resort (gift shop) – 1.6km east
- FOXFORD (retail) – 1.8km northeast

The area is predominantly agricultural, characterized by a dispersed settlement pattern with the majority of residential units being single, standalone structures spread across the landscape. Two small clusters of denser residential development exist, but they are minor and do not significantly alter the overall sparsely populated nature of the area including Kilmeaden immediately to the north and Ballyduff c.1.3km northwest.

As identified in Chapter 10 Noise and Vibration, the nearest noise sensitive locations (NSLs) within 5m of the Proposed Development site boundary are:

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- Residential dwellings to the northwest of energy centre and power generation facilities;
- Residential dwellings to the west of village centre and north of power generation facilities;
- Kilmeaden Health Clinic to east of village centre and northeast of power generation facilities;
- Residential dwellings to the south of warehouses and energy centre and east of solar farm; and
- Residential dwellings to the west of warehouses, south of energy centre and solar farm

4.3.2.1.2 Education, Childcare, Schools

There only a few educational centres within the study area including:

- Kiddies Kingdom (day care center) – 770m northwest
- Ballyduff National School (primary school) – 1.1km northwest
- Lawrence Sauvage - L 2 N - Learn to Drive (driving school) – 1.1km northeast

The closest secondary schools, and higher education institutions are located in the city of Waterford, c. 5.5km to 7.5km northeast of the Proposed Development and outside the study area. These include, but are not limited to, the National Learning Network (Waterford), St. Paul's National School, St. Paul's Community College, Waterford Youth Training and Education Centre (WYTEC), South East Technological University | Waterford and Waterford Institute of Technology West Campus.

4.3.2.1.3 Healthcare Services

The only healthcare services located within the study area are:

- HomeCare Waterford – Immediately to the north
- Kilmeaden Health Clinic – Immediately to the north

The closest hospital within the study area is the UPMC Whitfield Hospital located c. 5.07km northeast from the Proposed Development and outside the study area.

4.3.2.1.4 Emergency Services

There are no Garda Stations or Fire Stations within the study area. The nearest Garda Station is Portlaw Garda Station located c. 8 km northwest of the site, and the nearest Fire Station is the Waterford City Fire Station located c. 7.4km east of the site in Waterford City.

4.3.2.1.5 Green Infrastructure, Landscape and Amenity within the Study Area

Recreational facilities and green infrastructure within the Study Area include:

- Fairbrook House –1.7km north
- Valley Bowmen Archery Club – 1.5km southeast
- Crusaders AFC (sports club) – 1.7km northeast
- Mount Congreve Gardens – 1.9km northeast
- Kilmeaden Hazel Woods (national forest) – 800m northeast
- Kilmeaden Playground – Immediately to the north
- Knockaderry Reservoir – 1.3km south

In terms of landscape amenity, the site comprises lands previously developed for the Kilmeaden Cheese Factory (brownfield) and undeveloped greenfield lands. The topography rises from east to west with site levels range from 13.7m to 89m.

According to Chapter 12, Architectural and Cultural Heritage, there are three recorded archaeological sites or monuments within the Proposed Development lands that will not be directly impacted by the Proposed Development. There are no recorded architectural heritage sites within the Proposed Development lands.

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The brownfield (northeast) portion of the site contains existing hardstanding areas of the old roads and buildings of the Kilmeaden Cheese Factory. There is also a public road crossing the Proposed Development lands from its northwestern boundary to its southeastern boundary. Wooded areas are present mainly along the northwestern boundary.

The vicinity of the site is similar in character and used for agricultural purposes. As the Proposed Development consists of a complex masterplan including for a village centre, a solar farm and rewilding area, and a data centre with associated energy centre, the Proposed Development will cause a significant change in the current character of the site.

According to the Waterford City & County Development Plan 2022 – 2028, as outlined in section 11.3.1.1 of Chapter 11 (Landscape & Visual Impact Assessment), the subject lands fall under the Landscape Character Type 2B Kilmacthomas Lowlands, having a low sensitivity to new development. Areas of low sensitivity are defined within the Landscape Character Area (LCA) as having 'the potential to absorb a wide range of new developments subject to normal planning and development control procedures.

The northeast of the site is bounded by the R680, 7 no. residential houses, a commercial premises and agricultural lands. The southeast of the site is bounded by 21 no. residential houses and a minor public road linking the R681 and Coolagadden. The southwest of the site is bounded by agricultural land and private forestry, while the northwest of the site is bounded by a section of minor road linking Kilmeaden with Coolagadden and the back gardens of 7 no. private dwellings facing this road.

There are views from the site towards Ballyduff hill to the North West, towards Adamstown to the NE and towards Powersknock to the South East.

4.3.2.2 Tourism within the Study Area

Tourism is returning to strong growth and continues to play a hugely influential role in Irelands economic success. Tourism is an important indigenous sector in Waterford. According to the Waterford City & County Development Plan 2022 – 2028:

> *"Waterford has a reputation as an urban/ coastal/rural/cultural/ heritage destination with a mix of attractions and activities that appeal to a wide variety of visitors. Waterford's being 'Ireland's oldest city' sits well within Fáilte Ireland's branding Ireland's Ancient East and is underpinned by the strong heritage and culture theme of the Waterford Viking Triangle, Waterford's historic area. The unique combination of accessible city breaks with authentic heritage, coastal and rural outdoor activities and value for money has placed Waterford in a strong position to become one of the top visitor destinations in Ireland."*

Main touristic attractions within the study area comprise in the Waterford Suir Valley Railway located 1.6km northwest and Mount Congreve Gardens located 2km northeast from Proposed Development.

The upper portion of Proposed Development site, destined for proposed village centre and technology park, is zoned as "RV - Rural Village" and pertains to Objective No. DO1, designated to facilitate and encourage the development of new industrial/ enterprise/ employment uses on this site which do not detract from the amenity of the existing village. In line with the above, the proposed masterplan is in accordance with the zoning objectives as outlined in the Waterford City & County Development Plan 2022 – 2028. The Proposed Development once operational will create numerous employment opportunities and will have a potential positive impact on local tourism as it will bring more people to the local area and support the local economy.

4.3.2.3 Natural Resources within the Study Area

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4.3.2.3.1 Geological Heritage, and Economic Resources

Natural resources and land use in the study area has also been considered as they may have implications for the development of the lands. The closest active quarry (ID: 223), is located outside the study area and c. 23.4km to the northeast of the Proposed Development site. This quarry is listed as a Crushed Rock quarry and operations include excavations, rock breaking, blasting, crushing, dry screening and grading. This quarry is listed as a Non-Metallic Mineral Locality with Shale as key mineral and producing aggregates and washed dust.

A review of Geological Survey Ireland (GSI) online maps has shown that there is no Mineral Locality within the Study Area. The closest mineral locality to the Proposed Development is a Non-metallic Mineral locality located c. 2.8km east from Proposed Development, however with no mineral recorded.

There is one Geological Heritage site within the study area, the N25 Road Cuttings, located c. 0.7km northeast from Proposed Development site. The N25 Road Cuttings is a road cutting excavated on the n25 into slaty sedimentary rocks. According to ArcGIS (2024), the cuttings are excellent windows into rock types that are normally not well exposed.

4.3.2.3.2 Recreational Waters and Bathing Waterbodies

A review of EPA maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no protected Recreational Waters or Bathing Waterbodies within the Study Area.

The nearest waterbody to the Proposed Development is the WHELAN'S BRIDGE STREAM_010, located within Proposed Development site to its northeastern and southern portion and along the Proposed Development's eastern and western boundaries. The WHELAN'S BRIDGE STREAM_010 (EPA name) flows north into the Suir River, which ultimately discharges to the Barrow Suir Nore Estuary.

4.3.2.3.3 Drinking Water Resources

A review of GSI online maps that includes the Water Abstraction locations, and Groundwater Source Protection Areas has been undertaken. This shows no Groundwater Source Protection Areas within the Study Area. The nearest Groundwater Source Protection Area is the KILMACTHOMAS PWS BALLYOGARTY, located c. 11 km southwest of the site, while the closest Group Scheme Preliminary Source Protection is Ballydurn, located c. 10.8km northwest, also outside the study area for Proposed Development.

As stated in Chapter 5 Land, Soils and Geology, the GSI dataset for groundwater wells and springs indicates 10 no. wells are located within the boundary of the Proposed Development site. The wells usages are "*Industrial*" for 7 no. boreholes, 1 no. borehole for "*Domestic*" use and 3 no. well usages are currently unknown. A further 23 no. boreholes are mapped in the wider study area within a 2km radius of the Proposed Development site. As the site and surrounding area is serviced by public supply it is not considered that there is a risk for drinking water resource contamination.

4.3.3 Risk of Major Accident Hazards or Disasters

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those

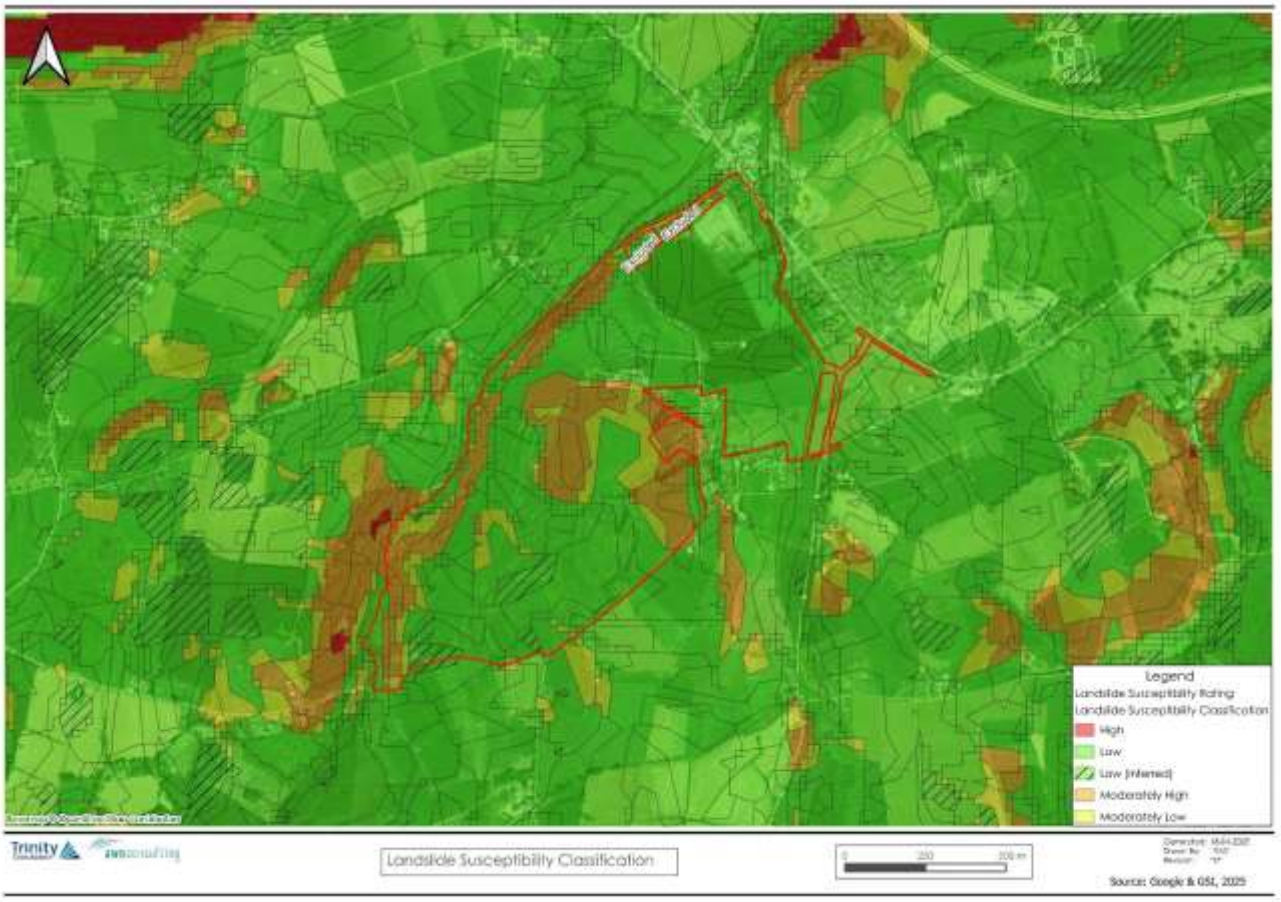
According to the data available by GSI (2024), the Proposed Development site has a mixed Landslide Susceptibility Classification, as shown below in Figure 4-7. The northern portion of the site, which is destined for the proposed village centre and technology park is classified as having a "Low" Landslide

Susceptibility. The mid and southern portion of the site, destined to the Solar & Rewilding Farm is divided in "Low", "Low Inferred" "Moderately High", "Moderately Low", and "High" Landslide Susceptibility due to the topographic profile of the area.

As the proposed village centre and technology park are located in a "Low" Landslide Susceptibility Classification area, there is a negligible risk of landslides occurring in densely populated areas of the site. Potential landslide events may occur at the mid and south portion of the site, however these will have no significant impact on human health, as the area will not be populated other than by a minor number of occasional maintenance workers.

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Figure 4-7 GSI Landslide Susceptibility Map (Source: GSI, 2025)



There is no history of seismic activity in the vicinity of the site. The nearest seismic activity occurred approximately 4km east of the site according to the Irish National Seismic Network operated by the Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS). There are no active volcanoes in Ireland so there is no risk of volcanic activity. Further detail is provided in Chapter 5 (Land, Soils and Geology).

The populated areas of Proposed Development are not vulnerable to landslides, and the site is not vulnerable to seismic activity or volcanic activity. Therefore, there is no significant potential for the Proposed Development to cause risks to human health due to its vulnerability to landslides, seismic activity or volcanic activity.

4.3.3.1.1 Proximity to Seveso or Industrial Emissions Sites

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances.

Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

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The purpose of the COMAH Regulations is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

As outlined in section 2.2.2 of Chapter 2 (Description of the Proposed Development), according to the HSE online register of Notified Seveso Establishments (https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/), there are no Upper or Lower Tier Seveso Establishments within Proposed Development study area. The closest notified Seveso Establishment is the Upper Tier Establishment, Trans-Stock Warehousing and Cold Storage Ltd, located at Christendom, Ferrybank, Waterford, c. 10.5km northeast from Proposed Development redline boundary.

Therefore, the Proposed Development is considered appropriate and with a negligible risk of being impacted by a COMAH site; and vice versa, there is a negligible risk of a COMAH site to be affected by the Proposed Development itself.

According to the EPA records, there are no active IE or IPC licensed facilities in the study area of 2.5km from Proposed Development.

4.3.3.1.2 Risk of Flooding

A Stage 1 Flood Risk Assessment (FRA) was carried out by AtkinsRéalis in January 2025 for the Proposed Development site and is included as Appendix 6.2 of Chapter 6 of this EIA Report. According to the report, there is localised flooding to the north of the site around the Wheelanbridge tributary. It should be noted that the only construction proposed in this area is the construction of earth embankments and that appropriate compensation storage has been provided. It is concluded that there is no significant residual risk from this.

The majority of the development is located within Flood Zone C, which is considered to have a low probability of flooding. A small portion of the development, specifically the earthwork embankments, is proposed within Flood Zones A and B, areas associated with a higher risk of flooding. However, given the nature of the works in these zones and the incorporation of flood risk mitigation measures, including the provision of compensation storage, the overall flood risk to and from the development is considered to be minimal.

There is historic risk of localised flooding on the L4018 which runs through the site however the low point associated with this is so small that it does not show up on sections cut through a detailed topographic survey. It is concluded that there is no significant risk posed from this event.

4.4 Characteristics of the Proposed Development

The Proposed Development will comprise a complex masterplan including four distinct but connected areas including a new village centre, a solar farm and rewilding area including grid scale battery storage, and a data centre with associated energy centre, to be located at Kilmeaden, County Waterford.

A full description of the development as reflected in the site notice description which can be found in Chapter 2.

4.5 Potential Impacts of the Proposed Development

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The main potential impacts on population and human health from the Proposed Development are potential for spills/leaks, air emissions, noise, visual, and traffic impacts. The baseline environment, pollution pathways, relevant mitigation measures and residual impacts have been assessed in greater detail within the corresponding specialist chapters; Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual Impact); and Chapter 13 (Traffic and Transportation).

A summary of the main potential impacts as they are relevant to human health criteria during construction and operation of the Proposed Development is presented herein.

4.5.1 Construction Phase

4.5.1.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are dealt with within the corresponding chapters of this EIA Report as follows:

- Chapter 8 – Air Quality
- Chapter 10 – Noise and Vibration
- Chapter 11 – Landscape and Visual Impact
- Chapter 13 – Traffic and Transportation

Construction will have an indirect positive effect on support industries such as builder suppliers, construction material manufacture, maintenance contracts, equipment supply, landscaping and other local services. There will also be a need to bring in specialist workers on a regular basis that may increase the above estimated working population at times. Specialists are only likely to stay for shorter periods depending on the nature of the work. The construction phase, therefore, is considered to have the potential to have a ***slight, short term*** *and* ***positive*** impact on the economy and employment of the local and wider area.

4.5.1.2 Potential Impacts on Landscape, Amenity and Tourism

There will be no impact on the local parks or the larger amenity areas. It is not anticipated the Proposed Development will have significant impact on local tourism or shopping amenities. The Proposed Development will not create any significant wastewater discharge which could have a potential impact on local amenities or the local population.

It is considered following landscape guidelines that the overall impact of the Proposed Development on the local landscape will be ***negative, moderate,*** and ***short-term*** during the construction phase. Based on the findings of Chapter 11 (Landscape and Visual Impact), during construction, the Proposed Development itself will mostly negatively impact sensitive visual receptors 5, 6, 7 and 8. The visual impact on VR 5 is likely to be ***negative, significant*** and ***short-term.***

4.5.1.3 Potential Impact from Land and Water Emissions on Human Health

With reference to Chapter 5 (Land, Soils and Geology), a reduction in soil quality via historical or unmitigated pollutants entering the soil has the potential to lead to negative impacts on human health during construction. Hydrocarbons and petroleum products for example have a risk for humans by inhaling the fumes / dust from contaminated soil. Depending on the type of contaminant and the level of exposure, soil contamination can have serious health implications.

In the absence of mitigation measures the potential impacts to human health during the construction phase on land, soils and geology are ***negative***, ***not significant*** and ***short term***.

With reference to Chapter 6 (Hydrology and Hydrogeology), as there are no recorded recreational waters, bathing waterbodies, no downgradient surface water abstraction points or Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas. Therefore, there is no potential for impacts on human health and populations with respect to the environmental factors Hydrology and Hydrogeology.

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4.5.1.4 Potential Impact from Air Quality on Human Health

The primary elements in relation to the construction of the Proposed Development with the potential to impact air quality and subsequently human health are:

- Dust soiling effects on people and property from general site preparation, construction vehicles and construction activities;
- Potential human health effects from dust (PM_{10} and $PM_{2.5}$) emissions from general site preparation, construction vehicles and construction activities;
- Engines emissions from construction vehicles or machinery and construction traffic.

There are approximately 15 no. high sensitivity residential properties within 20 m of the site boundary (Figure 8.4). In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) as referenced in Chapter 8 (Section 8.3.3.1) the overall sensitivity of the area to dust soiling impacts is medium based on the IAQM criteria outlined in Table 8.16. In addition, the IAQM criteria outlined in Table 8.16 indicates that the worst-case sensitivity of the area to dust-related human health effects is low.

Construction dust tends to be deposited within 250 m of a construction site however, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Johnstown Castle meteorological data indicates that the prevailing wind direction is south-westerly and wind speeds are generally moderate in nature (refer to Section 8.5.2.1). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30-year average data for Cork Airport meteorological station, the closest meteorological monitoring site with recent 30-year average data, indicates that on average 218 days per year have rainfall over 0.2 mm (Met Eireann, 2025) and therefore it can be determined that 76% of the time dust generation will be reduced due to natural meteorological conditions.

Combining the magnitude of the construction activities – demolition, earthworks, construction and trackout (movement of vehicles) – with the overall sensitivity of the area indicates there is at most a low risk of dust-related human health effects associated with the construction of the Proposed Development (refer to Table 8.18 of Chapter 8). In the absence of mitigation there is the potential for ***direct, short-term, negative*** and ***slight*** impacts to human health as a result of the Proposed Development.

There is also the potential for traffic emissions to affect air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as described in Section 8.2.3.2 of Chapter 8. It can therefore be determined that the construction stage traffic will have a ***direct, short-term, neutral*** and ***imperceptible impact*** on air quality, which is overall ***not significant*** in EIA terms.

4.5.1.5 Potential Impact from Noise and Vibration on Human Health

Noise criteria are provided by relevant bodies with consideration of the likely impact of noise on human health. The construction phase is short-term and therefore any elevated levels of noise will be of limited duration and, as a result, are not expected to pose any risk to human health. In terms of the noise

exposure of construction workers and potential hearing damage that may be caused due to exposure to high levels of noise, the Safety, Health and Welfare at Work (General Application) Regulations 2007 (Statutory Instrument No. 299 of 2007) provides guidance in terms of allowable workplace noise exposure levels for employees. The Regulations specify two noise Action Levels at which the employer is legally obliged to reduce the risk of exposure to noise. The appointed contractor will be required to comply with the Regulations and provide appropriate noise exposure mitigation measures where necessary. Therefore, in the absence of mitigation there is the potential for ***direct, short-term, negative*** and ***slight*** impacts to human health as a result of the Proposed Development.

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4.5.1.6 Potential Impact from Traffic and Transportation on Human Health

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states;

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians"*

In the Department of Communications, Climate Action & Environment document *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy* vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017).

An assessment of the additional traffic movements associated with the Proposed Development during the construction and operational phases is presented in Chapter 13 (Traffic and Transportation).

During construction, there will be temporary local disruption to pedestrian, cyclists, and vehicular traffic users along the Amberhill Road. The potential impacts may include:

- Increased vehicle movements associated with construction staff travelling to / from the site;
- Increased vehicle movements consisting of HGV and construction plant that may result in traffic congestion on roads;
- Increased queuing and congestion;
- Increased conflict between pedestrians / cyclists and vehicular traffic; and
- Severance of pedestrian and cycle routes.

It is considered that the predicted increases in traffic during the construction phase will have a ***slight, negative,*** and ***short-term*** impact on human health.

4.5.1.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The Proposed Development has the potential for an impact on the health and safety of workers employed during the construction phase. The activities of the applicant's contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimise the likelihood of any impacts on workers' health and safety.

As outlined in Section 4.3.3 there is a negligible risk of seismic activity, volcanic activity and sea level rise. Regarding landslides, there is a negligible risk of landslides occurring in densely populated areas of the site such as the proposed village centre and technology park.

There are no COMAH sites located within Proposed Development study area. The Proposed Development is considered appropriate and with a negligible risk of being impacted by a COMAH site.

As stated in the Stage 1 FRA (Appendix 6.2) and Section 4.3.3, the majority of the site is located within Flood Zone C with a small portion of the site located within Flood Zones A and B. However, given the nature of the works in these zones and the incorporation of flood risk mitigation measures, including the provision of compensation storage, the overall flood risk to and from the development is considered to be minimal.

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The potential effect is therefore ***imperceptible***, and unlikely, with respect to Major Accident Hazards or Natural Disasters on Population and Human Health during the Construction Phase of the Proposed Development.

4.5.2 Operational Phase

4.5.2.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are outlined in the following sections of this chapter and in detail within the corresponding chapters of this EIA Report as follows:

- Chapter 8 – Air Quality and Climate
- Chapter 10 – Noise and Vibration
- Chapter 11 – Landscape and Visual Impact
- Chapter 13 – Traffic and Transportation

When operational, the proposed masterplan at Kilmeaden will provide for a village centre comprising a medical centre, pharmacy, café, gym, community centre, commercial units, creche, two apartment blocks and a warehouse building, as well as a technology park. The operational phase of proposed masterplan will generate numerous employment opportunities, increased housing offer and improved essential services offer. As such, the Proposed Development will result in a ***positive, slight*** and ***long-term*** impact in the area during the operational phase.

4.5.2.2 Potential Impacts on Landscape, Amenity and Tourism

The Proposed Development once operational will have no impact on local tourism or shopping amenities. There will be no impact on the local parks or the larger amenity areas.

Visual impacts and amenity impacts perceived by individual persons are highly subjective and difficult to characterise. The landscape character of the subject lands will be notably changed from its current largely undeveloped character to that of built environment. Initial impact on human health due to the proposed changes to the landscape environment will be ***negative, moderate*** and ***medium-term*** while landscape proposals will cause a ***long-term, moderate positive impact***. Visual impacts will vary depending on where the view is observed. A review of 13 views is assessed in Chapter 11 (Landscape and Visual Impact) Table 11.6. During operation, these vary from ***positive*** to ***negative, slight*** to ***moderate*** and will be ***long-term.***

4.5.2.3 Potential Impact from Land and Water Emissions on Human Health

With reference to Chapter 5 (Land, Soils and Geology), there are no sensitive economic features, potential contamination or historical geological features at the site. During the operational phase of the Proposed Development there is no potential for impact on human health and populations due to changes in land, soil, and geology.

Therefore, on this basis in the absence of mitigation measures the potential impacts during the operational phase on human health and populations due to the potential for contamination of soils are ***neutral***, ***imperceptible*** and ***long term.***

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With reference to Chapter 6 (Hydrology and Hydrogeology) there is no potential for unmitigated off-site flooding as a result of the increased hardstanding areas due to the proposed design and drainage infrastructure proposed.

There are no recorded recreational waters, bathing waterbodies, surface water abstraction points located downstream of the Proposed Development site. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the Proposed Development site. Therefore, there is no potential for impacts on human health and populations with respect to the environmental factors Hydrology and Hydrogeology***.***

4.5.2.4 Potential Impact from Air Emissions on Human Health

As outlined in Chapter 8 (Air Quality), National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are set for the protection of human health and the environment. The applicable limit values in relation to the Proposed Development are set out in Table 8.1 of Chapter 8.

The key elements in relation to the operation of the Proposed Development with the potential to impact air quality and subsequently human health are:

- Engine emissions from vehicles accessing the site.
- Emissions associated with the operation of 16 no. gas turbines in the energy centre and 60 no. back-up generators in the ICT facilities have the potential to affect air quality.

Dispersion modelling of traffic emissions at sensitive receptors in proximity to (within 200 m) impacted road links during the operational phase indicate pollutant emissions will be in compliance with the TII assessment criteria which is based on the impacts in the opening year (refer to Section 8.2.2.1.4 and Table 8.3). The operational phase assessment outlined in Section 8.5.3.1 determined that the impact to air quality as a result of increased traffic volumes during the operational phase of the Proposed Development will be ***localised, direct, long-term, negative*** and ***not significant*** in EIA terms.

Detailed air dispersion modelling of emissions of NO_2 from the technology park (energy centre and ICT facilities) determined that pollutant concentrations will be in compliance with the relevant limit values set out in Table 8.1 which are set for the protection of human health. Therefore, emissions from the Proposed Development will have a ***direct, long-term, negative, slight*** and ***not significant*** impact on air quality.

Due to the design of the Proposed Development there is no potential for significant impacts to air quality during operation as a result of emissions***.***

4.5.2.5 Potential Impact from Noise and Vibration Emissions on Human Health

Exposure to excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include;

- Annoyance
- Sleep Disturbance
- Heart and circulation problems
- Quality of Life
- Cognitive Process

- Hearing

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The potential health effects of exposure to excessive noise include sleep disturbance, either from immediate physiological reactions during sleep (i.e. awakening reactions or body movements during sleep) and long-term adverse health effects (i.e. self-reported sleep disturbance). The Environmental Noise Guidelines for the European Region (World Health Organisation, 2018) recommend that the *Community Noise Guidelines* (WHO, 1999) and the *Night Noise Guidelines for Europe* (WHO, 2009) indoor guideline values remain valid e.g. setting an internal night-time level of no more than 30 dB $L_{Aeq,8hr}$ i.e. the level below which no adverse health effects were expected to occur.

Noise and vibration impacts associated with the development have been fully considered within Chapter 10 of the EIA Report.

The main potential noise impacts associated with the operation of the Proposed Development are noises related to building services, emergency site operations, and additional vehicular traffic on the public roads. Review of the predicted noise levels associated with the main potential noise impacts have been analysed further in Chapter 10 (Noise and Vibration). The detailed assessments have found that that the site-specific levels comply with noise criterion relevant to these proposed activities.

As presented in Chapter 10, Table 10-16, the cumulative noise levels with the proposed development added to the prevailing noise environment are 42 dB $L_{Aeq,T}$ external to the worst-affected noise-sensitive location. Allowing for a 15 dB reduction across an open window, the expected noise level internal noise level is below the indoor night-time WHO criterion. The expected health effect due to noise from the proposed development is classified as ***neutral***, ***not significant*** and ***long-term***.

There is no vibration source from the routine operations of the development that would cause impacts at nearby noise-sensitive locations. Therefore, the operational vibration effects of the proposed development are classified as ***neutral, imperceptible***, and ***long-term***.

4.5.2.6 Potential Impact from Traffic and Transportation on Human Health

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states:

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians"*

In the Department of Communications, Climate Action & Environment document *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy* vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017).

An assessment of the additional traffic movements associated with the Proposed Development during the construction and operational phases is presented in Chapter 13 (Traffic and Transportation). The traffic modelling results show that development traffic will have a ***neutral, imperceptible*** and ***long-term*** impact on queue and delays, in comparison to the baseline scenario.

4.5.2.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

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The Proposed Development has been designed with consideration given to the health and safety risks of people living and working in the vicinity. The facility has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience.

As outlined in Section 4.3.3 there is a negligible risk of external natural disasters; including seismic activity, volcanic activity and sea level rise. There is a negligible risk of landslides occurring in densely populated areas of the site. Potential landslide events may occur at the mid and south portion of the site, however these will have no significant impact on human health as the area will not be populated other than by a minor number of occasional maintenance workers.

COMAH related impacts are considered negligible as the closest notified Seveso Establishment is the Upper Tier Establishment, Trans-Stock Warehousing and Cold Storage Ltd is located c. 10.5km from Proposed Development.

As stated in the Stage 1 FRA (Appendix 6.2) and Section 4.3.3, the majority of the site is located within Flood Zone C with a small portion of the site located within Flood Zones A and B. However, given the nature of the works in these zones and the incorporation of flood risk mitigation measures, including the provision of compensation storage, the overall flood risk to and from the development is considered to be minimal.

The potential effect is therefore ***imperceptible***, and unlikely, respect of Major Accident Hazards or Natural Disasters on Population and Human Health Operational Phase of the Proposed Development.

4.6 Mitigation Measures

4.6.1 Construction Phase

The mitigation measures to address the potential impacts on population and human health from the Proposed Development have been assessed within the corresponding specialist chapters; Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual Impact); Chapter 13 (Traffic and Transportation).

4.6.1.1 Businesses and Residences

There are no potential likely significant impacts on Businesses and Residences therefore additional measures are not required. Any impact will be further mitigated by the use of binding hours of construction as well as the measures set out in Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual Impact); Chapter 13 (Traffic and Transportation).

4.6.1.2 Landscape, Amenity and Tourism

Proposed mitigation measures during construction phase can be classified as follows:

Mitigation by avoidance and design

- Development of a construction management plan as an integral part of the design process, with control of construction activity, traffic, materials storage and lighting with due consideration for neighbouring residences and surrounding area
- A site planning design strategy to retain boundary hedgerows and tree protection measures was designed and implemented as part of the design process.

Mitigation by prevention

- Site hoarding shall be erected to screen view of construction activity.
- Tree protection measures will be installed ensure vegetation to be retained is fully protected during the construction process

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Mitigation by reduction

- Monitoring of construction management plan and tree protection measures throughout the construction phase

4.6.1.3 Land and Water Emissions

All mitigation measures outlined within the Chapter 5 (Land, Soils and Geology) and Chapter 6 (Hydrology and Hydrogeology) will be implemented in accordance with Construction Environmental Management Plan (CEMP), as well as any additional measures required pursuant to planning conditions which may be imposed. The construction phase mitigation measures set out in the CEMP, will be implemented by the construction contractor to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

4.6.1.4 Air Emissions

A suite of best practice dust mitigation measures appropriate for sites with a medium risk of dust impacts are outlined in Section 8.6.1 of Chapter 8. These include measures for dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. The measures draw on best practice guidance from Ireland, *Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition* (DCC, 2018), the UK, *Guidance on the Assessment of Dust from Demolition and Construction Version 2.2* (IAQM, 2024), *Controlling Particles, Vapours & Noise Pollution from Construction Sites* (BRE, 2003), *Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings* (The Scottish Office, 1996), *Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance* (ODPM, 2002)) and the USA, *Fugitive Dust Technical Information Document for the Best Available Control Measures* (USEPA, 1997).

The dust mitigation measures proposed in Chapter 8 will reduce dust emissions and thus dust-related human health effects.

4.6.1.5 Noise and Vibration Emissions

Mitigation measures proposed to minimise the potential effects on human health in terms of noise and vibration during the construction phase are set out in the CMP and Chapter 10.

Mitigation measures for the construction phase include carrying our works during daytime periods only, appointing a noise liaison officer to manage notifications to nearby noise-sensitive locations about upcoming disruptive activities and handle any noise-related complaints. The contractor will implement several general measures: avoiding unnecessary engine revving, switching off equipment when not in use, maintaining haul roads to high standards, avoiding steep gradients, minimizing the drop height of materials, and starting plant equipment sequentially rather than simultaneously.

Best Practicable Means (BPM) will be applied to ensure the use of the quietest equipment available, with enhanced sound reduction methods such as enclosures where necessary. Equipment will be positioned as far as possible from noise-sensitive areas, and regular maintenance by trained personnel will help minimize noise and vibration. Additionally, high-noise and vibration activities will be restricted to certain hours to reduce disruption. A site representative will be appointed to oversee noise and vibration management before construction begins.

4.6.1.6 Traffic and Transportation

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For the Construction Phase, the development will adopt off-peak arrival and departure times for the construction staff to ensure construction flows do not overlap with the surrounding road network peak periods. The contractor will also develop a detailed Logistics Plan to identify the delivery schedule requirements for every delivery, and implement a detailed Construction Traffic Management Plan which will address the following key issues:

- Maintaining free traffic flow along the local road networks.
- Ensuring all footpaths and road surfaces are always free from debris.
- Ensuring the efficient free flow of operatives entering and exiting the proposed development site.
- Managing the distribution flow of materials within the site and debris removal to maintain the required levels of productivity whilst achieving the high-quality standards expected.
- Plant and operative segregation during all stages of the proposed development.
- Robust traffic management principles and practices will need to be enforced to ensure construction traffic does not create congestion and cause inconvenience to the adjacent tenants and the public.
- Protection to the public for the duration of the project construction phase on all elevations.

4.6.1.7 Major Accident Hazards and/or Natural Disasters

All mitigation measures outlined in the submitted CEMP will be implemented throughout the construction phase of the development. This will include mitigation measures outlined within this EIAR. The CEMP includes emergency response procedures for environmental incidents. It will be continuously updated to manage risks during construction.

4.6.2 Operational Phase

The mitigation measures to address the potential impacts on population and human health from the Proposed Development have been assessed within the corresponding specialist chapters; Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual Impact); Chapter 13 (Traffic and Transportation).

4.6.2.1 Businesses and Residences

There are no potential likely significant impacts on Businesses and Residences therefore additional mitigation measures are not required.

4.6.2.2 Landscape, Amenity and Tourism

Proposed mitigation measures during operational phase can be classified as follows:

Mitigation by avoidance and design

- The architectural design of the building aims to reduce the visual mass through its form and choice of materials.
- The retention of existing native hedgerows will assist the visual integration of the building into the landscape and mitigate the visual impact.
- The landscape proposals include green links, trees, hedgerows, wetlands, SUDS features, woodland blocks and wildflower meadow. These elements will assist the visual integration of the building into the landscape and mitigate the visual impact.

Mitigation by prevention

- Creation of new hedgerows and tree belts in locations where they will aid visual integration of the scheme and reduce negative visual impacts.

Mitigation by reduction

- Periodic tree surveys and implementation of a tree management plan for the mature trees on site to ensure their continued sustainability.
- The implementation and monitoring of a landscape management plan for the full duration of the defects liability period to ensure successful establishment of the proposed planting scheme and trees.

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4.6.2.3 Land and Water Emissions

The proposed design incorporates SuDs measures including oil interceptors on drainage, surface water attenuation and bunding of all fuel tanks (HVO) in accordance with EPA best practice. Strict separation of surface water and wastewater will be implemented within the development.

4.6.2.4 Air Emissions

No additional mitigation measures are proposed for the operational phase of the Proposed Development. Air dispersion modelling has determined that concentrations of all pollutants are in compliance with the relevant ambient air quality standards.

4.6.2.5 Noise and Vibration Emissions

To minimise noise from external plant, low-noise equipment and or specific attenuation measures will be selected to achieve the operational noise outputs detailed in Chapter 10 (Noise and Vibration) be used. This approach, integrated into the detailed design process, will ensure that the site operates within the noise limits established by best practice guidance.

Noise mitigation measures for traffic generated during the operational phase of the development are not considered necessary.

4.6.2.6 Traffic and Transportation

For the Operational Phase, a Mobility Management Plan (MMP) will be developed to mitigate the anticipated increase in traffic volumes. Efforts will be made to utilise local public transport network, road network and active travel facilities in the most efficient ways possible that will be encouraged through appropriate cycle parking and storage facilities on the proposed development. Staff will be made aware about the public transport facilities nearby. The measure will also include making people aware about "Cycle to Work Scheme" and "Taxsaver Commuter Ticket Scheme".

A MMP Manager will be appointed by the developer as the main point of contact and coordinator of MMP activities for monitoring and achieving sustainable travel targets.

The implementation of the MMP will encourage sustainable travel to and from the site to further minimise the impact of the development traffic once in the Operational Phase.

4.6.2.7 Major Accident Hazards and/or Natural Disasters

The potential effect is imperceptible, and unlikely, in respect of major accident hazards or natural disasters on population and human health during the operational phase of the Proposed Development. Therefore, no specific mitigation measures are required.

4.7 Residual Impacts of the Proposed Development

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4.7.1 Construction Phase

4.7.1.1 Businesses and Residences

It is predicted that there will be a slight positive impact on local business activity during the construction phase with the increased presence of construction workers using local facilities. This job creation will result in a ***positive, local*** to ***regional, imperceptible***, ***short-term*** socioeconomic impact.

The presence of these site personnel in the area during the construction phase will create a slight additional demand in the area for services, particularly for food from local shops, restaurants and cafés. There will also be economic benefits for providers of construction materials and other supporting services, e.g., quarries. This is predicted to result in a ***positive, local*** to ***regional, indirect, not-significant, short-term*** socioeconomic impact.

The residual impacts on local businesses and residences in relation to air quality, noise, visual impact, and traffic has been summarised in the below sections.

4.7.1.2 Landscape, Amenity and Tourism

The preventative and reduction mitigation measures listed will ensure the integrated design mitigation measures are successful and impact on the local landscape will be ***negative, moderate,*** and ***short-term*** with a ***negative, significant,*** however ***short-term*** visual impact at the most sensitive visual receptor.

The Proposed Development will have no discernible effect on local tourism or amenities during construction stage.

4.7.1.3 Land and Water Emissions

There are no source pathway linkages to potable water supplies or water amenities. Residual impacts during the construction phase in respect of the environmental factors of Soils, Geology, Hydrology and Hydrogeology will be ***short term-imperceptible-neutral.***

4.7.1.4 Air Emissions

Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the residual effect of the construction phase of the Proposed Development with respect to air quality and human health is ***direct, short-term, negative*** and ***not significant***.

4.7.1.5 Noise and Vibration Emissions

As detailed in Chapter 10 (Noise and Vibration), there will be some impact on nearby noise sensitive receptors during construction, due to noise emissions from site activity, traffic, and other activities. The application of noise and vibration limits and limits on the hours of operation (as per Table 10.1, 10.4 and Section 10.2.2 and 10.2.4), along with implementation of appropriate noise and vibration control measures (as summarised in Section 10.6.1), will ensure that noise and vibration impact is kept to a minimum. Due to the short-term duration of the work, the noise and vibration limits in place, this phase of work will not give rise to any significant health effects. With mitigation, impacts to human health due to noise as a result of the Proposed Development effects are ***direct, short-term, negative*** and ***not significant.***

4.7.1.6 Traffic and Transportation

Ensured that the proposed mitigation measures are implemented during construction phase, the impact of the traffic increase on human health and populations will remain ***negative***, ***slight*** and ***short-term***, not significant in EIA terms.

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4.7.1.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on human health from major accident hazards and/or natural disasters; therefore, there are no residual impacts.

4.7.2 Operational Phase

4.7.2.1 Businesses and Residences

The Proposed Development will result in an ***imperceptible, positive*** impact due to increased employment opportunities and improved accessibility to jobs in the area during the operation phases.

The predicted impacts on local businesses and residences in relation to air quality, noise, visual impact, and traffic has been summarised below.

4.7.2.2 Landscape, Amenity and Tourism

The proposed development includes a landscape scheme which prioritises the retention and enhancement of the hedgerows and tree belts around the perimeter and the creation of a network of landscape spaces which will become a publicly accessible park. The landscape proposals will cause a ***long-term, moderate positive impact*** to the Landscape Character.

As per Chapter 11, the ameliorative mitigation measures, as listed in section 11.6.1, will reduce the effects of the Proposed Development on several of the listed visual receptors. Visual operational impacts are deemed to be of a ***negative*** quality with a significance no greater than ***Moderate*** and long-term duration.

The Proposed Development will have no discernible effect on local tourism or amenities during operational stage.

4.7.2.3 Land and Water Emissions

There are no source pathway linkages to potable water supplies or water amenities. As such the implementation of the design measures will continue to ensure that the residual impacts during the operational phase in respect of the environmental factor of Soils, Geology, Hydrogeology and Hydrology are ***long-term, imperceptible, neutral***.

4.7.2.4 Air Emissions

As detailed in Chapter 8 (Air Quality), air dispersion modelling of operational traffic emissions as well as emissions from the proposed technology park was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the dispersion modelling results, pollutant concentrations with the Proposed Development operational are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health. The impacts to human health are predicted to be ***direct, long-term*** and ***not significant***.

4.7.2.5 Noise and Vibration Emissions

Once the operational noise levels are controlled to the limit values set out in Chapter 10, there are no expected impacts to sleep disturbance from operational noise sources. The expected residual health effect due to noise from the proposed development is classified as ***neutral***, ***not significant*** and ***long-term***.

No mitigation is required regarding the additional vehicular traffic on public roads, as the impact is considered ***negative, not significant, and long-term***.

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4.7.2.6 Traffic and Transportation

The mitigation measures the during operational phase, such as the implementation of the MMP, will ensure that there will be no significant residual effects of Proposed Development trips on human health and populations. Through the implementation of the MMP from early stages of the operational phase, it is anticipated that the effects of the proposed development both on the local road network and on human beings will continue to be ***neutral***, ***imperceptible*** and ***long-term***.

4.7.2.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on Human Health from Major Accident Hazards and/or Natural Disasters; therefore, there are no residual impacts.

4.8 Cumulative Impact Assessment

The cumulative impact of the Proposed Development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8 of this EIA Report.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

4.8.1 Construction Phase

In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase and contribute to additional impacts in terms of traffic, dust, and noise.

Contractors for the Proposed Development will be contractually required to operate in compliance with a project-specific CEMP and Construction Traffic Management Plan which will include the mitigation measures outlined in this EIA Report. The construction phase for the overall development of the applicant owned lands would be restricted by the binding limits for noise, dust, and emissions to water.

The implementation of mitigation and monitoring measures detailed in Chapter 6 as well as the compliance of permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change in surface water during the construction phase of the Proposed Development. The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

According to the IAQM guidance (2024) should the construction phase of the Proposed Development coincide with the construction phase of any other development within 500m then there is the potential for cumulative construction dust impacts. The Proposed Development has been assessed as having at most a low risk of dust-related human health impacts during the construction phase. A number of mitigation measures have been proposed in order to ensure significant dust impacts do not occur. Provided the

mitigation measures outlined in Section 8.6.1 of Chapter 8 (Air Quality), are implemented throughout the construction phase of the Proposed Development significant cumulative dust impacts are not predicted. Impacts are predicted to be ***direct, short-term, negative*** and ***not significant.***

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All known permitted developments in the study area have been considered to access the traffic impacts of the Proposed Development. Chapter 13 (Traffic and Transportation) states that the traffic analysis conducted shows that the Proposed Development at Kilmeaden does not result in any cumulative impacts on the local or strategic road network during the construction phase.

The construction activities for the neighbourhood centre and residential areas will be similar in scale, duration, and typology to those of the already permitted and partially constructed residential developments, while the solar farm component will have the same impacts as other approved solar farm schemes in the area. Additionally, existing activities in local warehouses, agricultural buildings, and garages (despite less intrusive) would generate comparable impacts on landscape character and visual perception. Therefore, the proposed development's impact would not be out of place in the local landscape, and the surrounding existing and permitted developments would help reduce its overall effect on landscape character and visual impact.

The implementation of mitigation measures within each chapter and detailed in Section 4.6.1; as well as the compliance of adjacent development with their respective planning permissions, will ensure there will be minimal cumulative potential for change in soil quality or the natural groundwater regime during the construction phase of the Proposed Development.

4.8.2 Operational Phase

During operation, the visual impacts of the proposed development will largely resemble those of existing and permitted developments, with the neighbourhood centre and apartment blocks designed to integrate into the village's existing fabric in both form and finish, reading as an extension of Kilmeaden's residential and commercial areas. Similarly, the data halls and energy centre will align visually with the village's existing industrial units and warehouses. Although the proposed development is of a larger scale and will initially have a moderate negative impact, this will lessen over time as the landscape scheme matures. The site's historical context, particularly the northern section previously used as a factory with remaining derelict structures, reinforces that the proposed public realm and landscaping will positively enhance both landscape character and visual amenity.

The implementation of design measures and monitoring measures detailed in chapter 6 as well as the compliance of the permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change in surface water during the operational phase of the Proposed Development. The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***long-term.***

The potential cumulative impacts of the Proposed Development during the operational phase in terms of air emissions and noise generation in the context of the Permitted Development have been considered in Chapter 8 (Air Quality) and Chapter 10 (Noise and Vibration).

There is the potential for cumulative impacts to air quality during the operational phase due to traffic associated with other existing and permitted developments within the area. The traffic data supplied for the operational phase assessment included data for cumulative development within the area. The effect on air quality during the operational phase of the Proposed Development, including the cumulative effect, will be ***direct, long-term, negative*** and ***not significant***.

The potential for cumulative impact of the emissions from the proposed technology park with Industrial Emissions (IE) licenced or Integrated Pollution Control (IPC) installations has been considered, in line with the methodology of AG4 (EPA, 2020). The closest IPC or IE licenced facilities are over 6 km from the

Proposed Development. At this distance it is unlikely that the emission plumes from the Proposed Development and the licenced sites would significantly interact. Therefore, the potential for cumulative impacts is not predicted and a detailed cumulative air dispersion modelling assessment has been scoped out.

All known permitted developments in the study area have been considered to access the traffic impacts of the Proposed Development. Chapter 13 (Traffic and Transportation) states that the traffic analysis conducted shows that the Proposed Development at Kilmeaden results in ***'Imperceptible'*** cumulative impacts on the local or strategic road network during the operational phase.

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4.9 References

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- Central Statistics Office. Census of Population, 2011 and 2016. (Accessed December 2024, https://www.cso.ie/en/census/).
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Chapter 5 – Land, Soils and Geology

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5. LAND, SOILS AND GEOLOGY

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5.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the Proposed Development will have on Land, Soils and Geology. This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). Reference is made to hydrogeology, but this aspect is covered in more detail in Chapter 6 (Hydrology & Hydrogeology).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts, and define the residual effects of the proposed Overall Development (the effect after the implementation of mitigation measures).

5.2 Methodology

The assessment follows the procedures set out in the Institute of Geologists of Ireland (IGI) Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements (2013) and other relevant guidelines set out below to assess and evaluates land, soils and geology within the context of the proposed development. This assessment includes a review of the existing environment, the potential impacts of the proposed development, mitigation measures, and the potential impacts.

In the EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that attribute.

The Transport Infrastructure Ireland (TII) (formerly National Roads Authority) criteria is used for estimating the importance of the soil, geology and hydrogeological attribute (Table 1 in Appendix 6.1).

The magnitude of the potential environmental impacts effects on the land, soil, geological and hydrogeological environment is based on the TII matrix presented in Table 2 in Appendix 6.1 and the quality, significance and duration of potential impacts are described in this chapter in accordance with the criteria provided in the Chapter 1 (Introduction), Table 1.2.

In assessing likely potential and predicted impacts, account has been taken of both the importance of the attributes and the predicted scale and duration of the likely impacts. Where an impact is identified, planned mitigation measures are identified and assessed.

The principal attributes (and impacts) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well or requirement to remove it off-site as waste for disposal or recovery;

5.2.1 Forecasting Methods and Difficulties Encountered

A previous site investigation (2009) was relied on for assessment of soil quality beneath the former Kilmeaden Cheese Plant. A walkover confirmed no evidence of change in site conditions since this assessment was undertaken. No borehole log data was available from this study. Site investigation will be undertaken as part of pre construction works and as such the assessment is based on expected cut and fill and design foundations provided by development engineers (Atkins Realis).

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5.2.2 Legislation, Guidance & Planning Policy

The baseline study and impact assessment have will be out in accordance with the following key guidance and established best practice:

- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022a).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Transport Infrastructure Ireland - Road Drainage and Water Environment (TII, 2015).
- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW).

Land soil and geology resource management in Ireland is dealt with in the following key pieces of legislation and guidelines:

- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- Waste Management Acts 1996 as amended;
- Environment Agency (EA), Land contamination: risk assessment (EA 2020);
- BS 10175:2011 + A2:2017 Investigation of potentially contaminated sites. Code of practice (British Standards Institute 2017);
- CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA 2001);
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Transport Infrastructure Ireland, The Management of Waste from National Road Construction Projects (TII 2017);
- Environmental Protection Agency, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013);
- Local Authority planning guidance as applicable,
- Consolidated EIA Directive 2011/92/EU and 2014/52/EU.

5.2.3 Desktop Study

In line with the above guidance, the assessment considers the existing land soil and geological regime in the vicinity of the Proposed Development. The data source to aid in assessing the existing baseline environment are as follows:

- An Foras Talúntais (1980) General Soil Map of Ireland (An Foras Talúntais 1980);
- Teagasc Irish Soil Information System online map (Teagasc);
- Historic Mine Sites – Inventory and Risk Classification (EPA and Geological Survey Ireland (GSI);

- GSI online geology viewer (GSI);
- 1:500,000 scale – Quaternary Geological Map of Ireland (GSI);
- 1:1,000,000 scale – Bedrock Geology of Ireland (GSI);
- Topographic-map.com online viewer (topographic-map);
- GeoHive, Ordnance Survey Ireland online spatial data viewer (OSI);
- Current and historical mapping; and
- EPA Interactive Map (EPA 2025).

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This Chapter will assess the potential effects of the Proposed Development on the following topics:

- Soils and superficial geology;
- Bedrock geology;
- Karst Landforms;
- Landslide Susceptibility;
- Current and historic mining sites;
- Irish Geological Heritage Sites; and
- Contaminated land.

5.3 Receiving Environment

5.3.1 Land Use, Topography and Site History

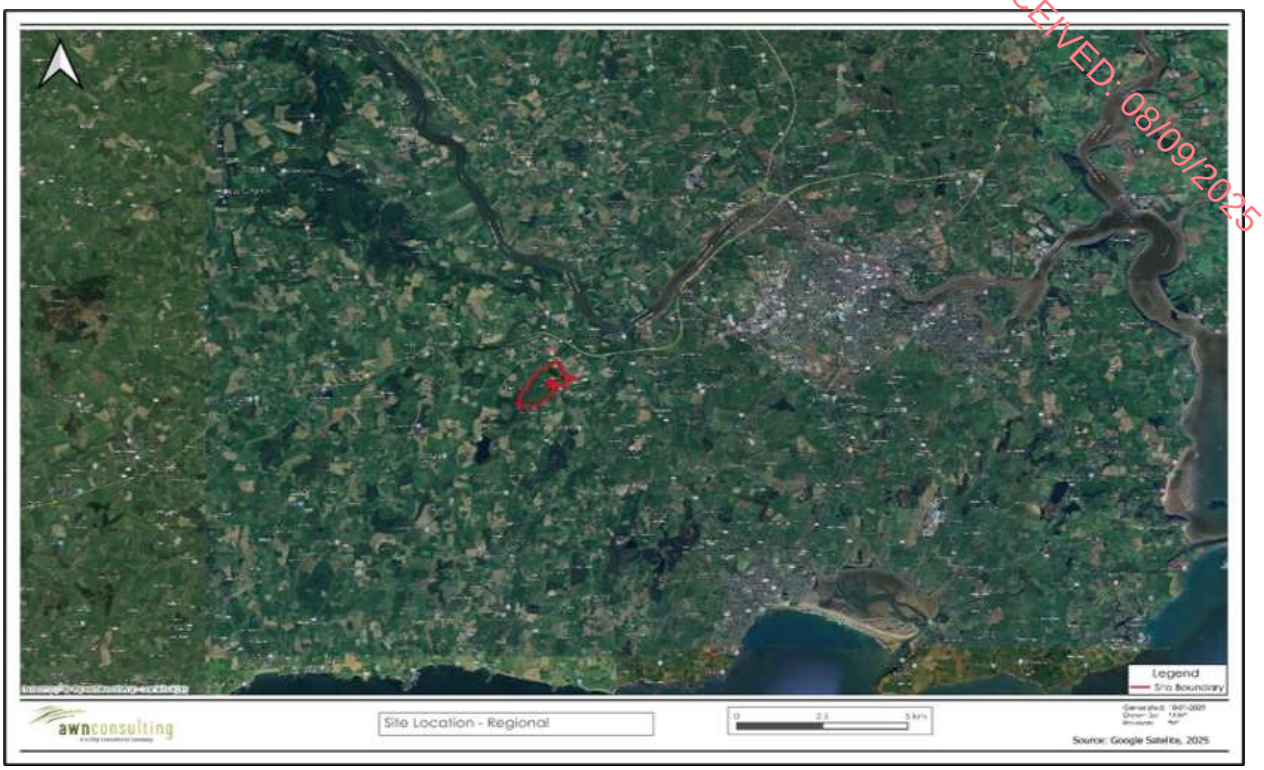
The proposed development covers an area of c. 108.64 hectares of which c. 26.7 hectares is the proposed Technology Park and Village Centre, and the remainder is the proposed solar panel farm. The site is surrounded primarily by agricultural land to the north south and west and is bounded by Kilmeaden village to the east.

The approximate topographical levels for the proposed site range between 89.0AoD to 15.0mAOD. The site is containing a hill with the highest point of 89.0mAoD in the center and the lowest point 15mAoD to the northeast where the main entrance to the old Cheese Factory is located. The site slopes to the north-east towards the Whelanbridge Trib 1 (European Code: IE_SE_16W010400) and Whelanbridge River (European Code: IE_SE_16W010400).

Figure 5.1 below presents the lands subject to this application indicated by the red line boundary and surrounding land uses.

Figure 5.1 Site Location & Surrounding Land Use (Google Satellite, 2025)

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5.3.2 Soils and Subsoils

The land use in the surrounding vicinity of the proposed development is mostly rural greenfield sites but also comprises existing residential properties and farms. The site slopes in a southeastern direction.
The GSI/Teagasc (2025) mapping currently denotes two principal soil types occurring across the site, which are identified as follows:

- The northeastern section of the site is underlain by River alluvium with poorly drained mineral soils.
- The southwestern section of the site is underlain by Fine loamy drift with igneous & metamorphic stones with well drained mineral soils

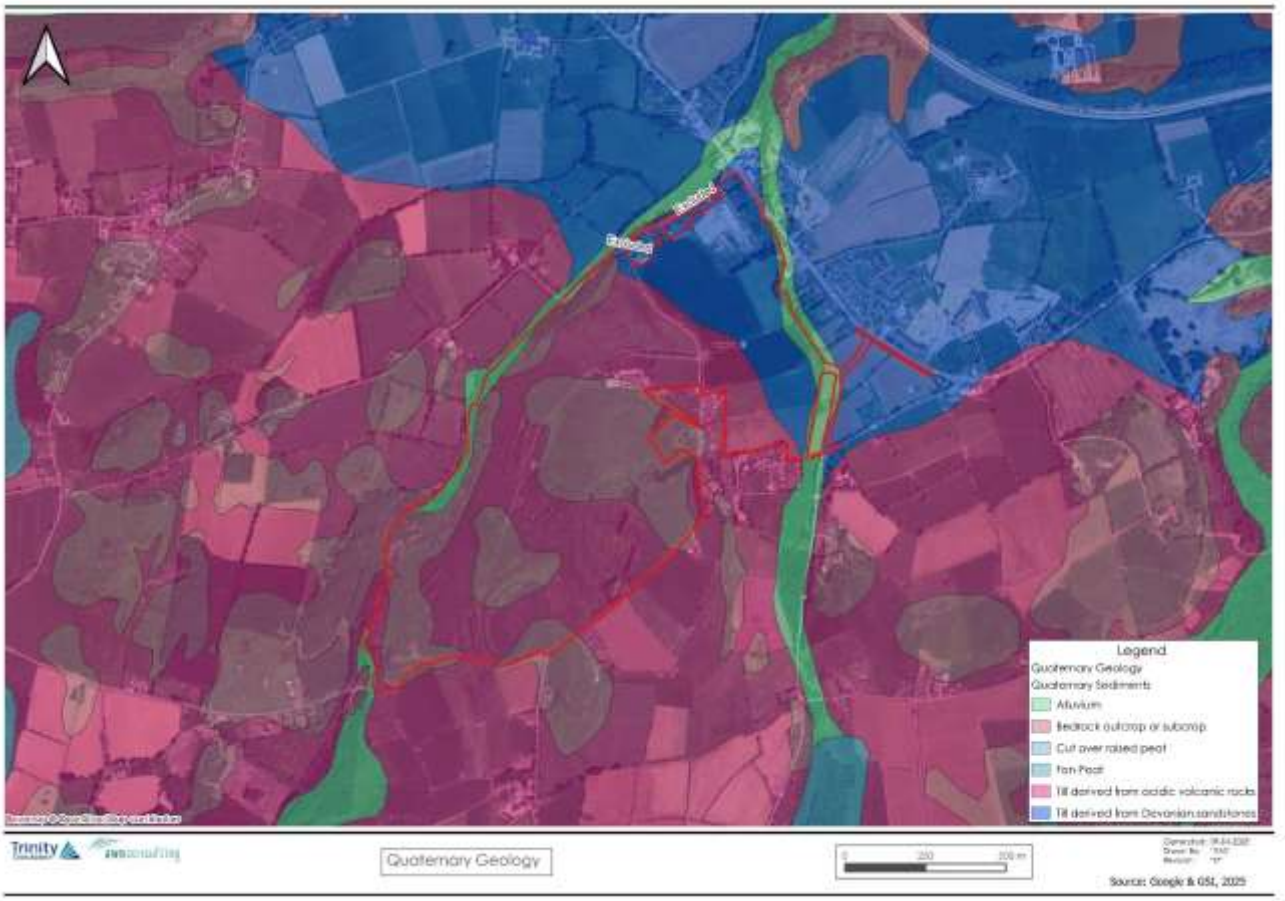
Based on a review of GSI online mapping, the proposed development is predominantly underlain by tills from acidic volcanic rocks subsoils while the northeastern section of the site is underlain by tills from Devonian sandstone subsoils. Alluvium was identified along the northern and eastern boundary of site in the vicinity of the Whelanbridge River and its tributary. The central and western section of the site is shown to have hilly terrain and it's described to be underlain by bedrock outcrop and subcrop as shown in Figure 5.3 (GSI, 2025). A section of the site comprises land previously developed for Kilmeaden Cheese Plant.

Figure 5.2 Land Use (Photo, 2025)

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Figure 5.3 Quaternary Geology (GSI, 2025)



5.3.3 Bedrock Geology

According to GSI (2025), it was identified that majority of the site is underlain by In Campile Formation which is described as Felsic and Intermediate Volcanic rocks. The northeastern section of the site is

underlain by Dark grey slate with thin Siltstone of Ross Member Formation. Bedrock outcrops can be seen predominantly along the northern and western boundary of the site as shown in Figure 5.4.

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Figure 5.4 Bedrock Geology (GSI, 2025)



5.3.4 Geological Heritage Areas

No geological heritage areas are identified with the site boundary (GSI, 2025). The closest geo-heritage area is located c. 650m east of the site and is identified as N25 Road Cuttings as shown in Figure 5.5. The three cuttings are good representative sections of the sedimentary rocks associated with the Ordovician volcanic bedrock that underlies most of eastern Waterford. They are of County Geological Site importance (Waterford County Geological Site Report).

The geological heritage site is described as an *"excellent windows into rock types that are normally not well exposed in the visible rock exposures seen across the Waterford landscape. The Campile Formation comprises a belt of rocks extending from north Wexford down to the Copper Coast and is commonly characterised as being principally volcanic rocks. However, the volcanic rocks are more resistant and tend to be the visible exposures, but the major part of the Campile Formation comprises slaty sediments, such as those in these cuttings"*

Figure 5.5 Geological Heritage Sites (GSI, 2025)

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5.3.5 Economic Geology

The GSI (2025) mineral database was consulted to determine whether there were any mineral sites in close proximity of the study area. There are no recorded mineral localities within a 2km radius. The closest identified is a non-metallic mineral locality c.2.5km east of the site in the townland of Orchardstown.

5.3.6 Groundwater Vulnerability Rating

Groundwater vulnerability is a term used to represent the natural ground, intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/ or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater vulnerability is an indication of how easily the aquifer can become contaminated by human activity. It is dependent on the thickness and permeability of the overlying soils and depth to the water table. For example, a bedrock aquifer with minimal thickness of overburden or with a thin layer of permeable overburden will be more vulnerable to contamination than a bedrock aquifer which has a thick layer of low permeability overburden. Extreme groundwater vulnerability is also associated with karst landforms as these are a direct pathway for water and contaminants to enter the aquifer from the surface.

The GSI presently classifies the aquifer underlying the proposed development site with several vulnerability classifications. The eastern section of the proposed development site is classified by the GSI as having

'Moderate' (M) to 'High' (H) vulnerability. The western portion of the proposed development site is classified as having 'Extreme' (E) to 'Rock at or Near Surface or Karst' (X), where a higher elevation is encountered and bedrock outcrops are mapped as shown in Figure 5.6.

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Figure 5.6 Groundwater Vulnerability Rating (GSI, 2025)



Aquifer vulnerability classifications are primarily based on the permeability and thickness of subsoils. Refer to Table 5-1 below.

Table 5-1 Vulnerability Mapping Guidelines (Source (DoELG, EPA, GSI, 1999)

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	>3.0m	3.0 - 10.0m	3.0 - 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

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The GSI vulnerability classification is relatively consistent with data obtained from the site investigations carried out by Malone O' Regan (MOR), phased between July and November 2009 at the proposed development site, where ground conditions at the proposed development site of the main 3 no. ICT buildings, energy centre and village centre comprised made ground generally consisting of hardcore and/or concrete overlying reworked clay/silt or gravel to a maximum depth of 2.6m BGL at PH13. Natural soil encountered beneath the made ground comprised of firm to stiff sandy clay and/or silt with varying portions of sand and gravel, localised lenses of gravel were associated with top of weathered bedrock. Bedrock was encountered at the site at depths ranging from 0.2m BGL at MW10 in the west of the site where the proposed solar farm is located, to 9.0m BGL at MW12 in the north-east of the site where the proposed village centre is located. The bedrock conditions encountered generally comprised of limestone, mudstone/siltstone and sandstone.

Perched groundwater was also encountered as minor seepages/saturated soil at depths ranging from 0.2m BGL at PH2 (beneath the proposed ICT buildings) to 4.9m BGL at TP3 (c. 200m west of the proposed energy centre). The perched water was generally associated with granular material or top of weathered bedrock.

5.3.7 Karst Landforms

Karst is a landscape with distinctive hydrology and landforms that arise when the underlying rock is soluble. Although karst can develop on evaporate rocks such as gypsum and siliceous rocks such as quartzite, the vast majority of karst landforms are found on carbonate rocks, such as limestones. Karst landscapes may have sinkholes, caves, enclosed depressions, disappearing streams, springs and sinkholes.

No karst landforms have been identified within the site boundary or in the vicinity of the proposed development. The closest karst feature is a spring located c.4.7km north of the development (GSI, 2025).

5.3.8 Geohazards

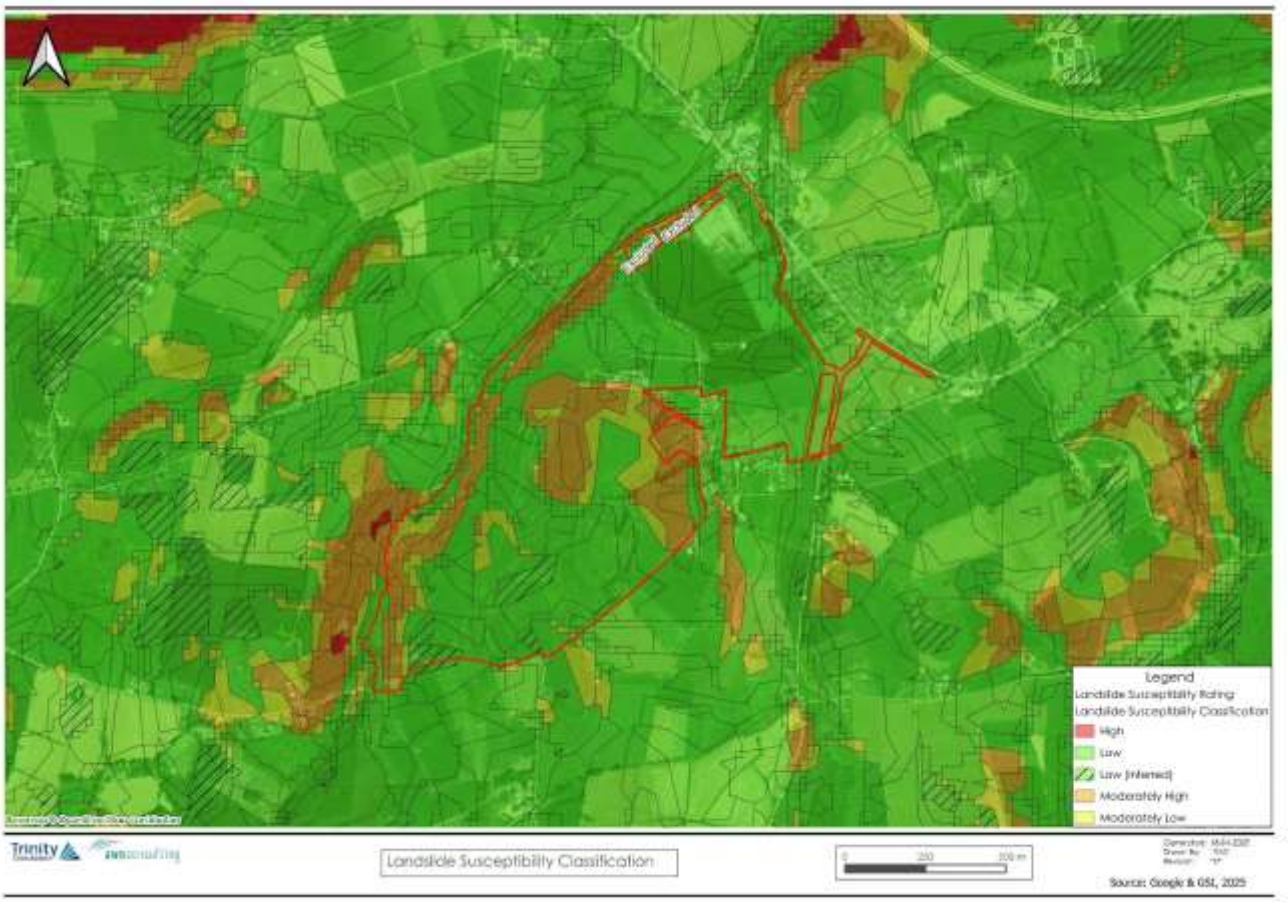
Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

A landslide susceptibility map identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility classification takes into account where the landslides occur and what causes them (slope, soil type and the impact of the flow of water in an area).

The landslide susceptibility classification of the site ranges between 'Low' and 'Moderately High'. Although, the majority of the site is classified as 'Low' and 'Low Inferred'. However, areas of 'Moderately Low' and 'Moderately High' are mainly present in the centre of the site with highest elevation levels and along the north and northwestern boundary of the proposed development as shown in Figure 5.7 (GSI, 2025).

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Figure 5.7 Landslide Susceptibility Classification (GSI, 2025)



5.3.9 Historical Land Use and Environment

The entire area was greenfield until 1965 when development of the former factory was initiated in the northeastern section of the site. Production operations ceased at the facility in 2005.

The 'Kilmeaden Cheddar Cheese' factory was constructed in 1965 and comprised the main factory building in the eastern portion of site which included the cheese production area, boiler house fuelled by natural gas and offices. The raw milk intake silos for this factory were located to the south of the building with an associated truck wash area. Cheese production was carried out at the 'Cheddar Cheese' factory from 1965 to 2005.

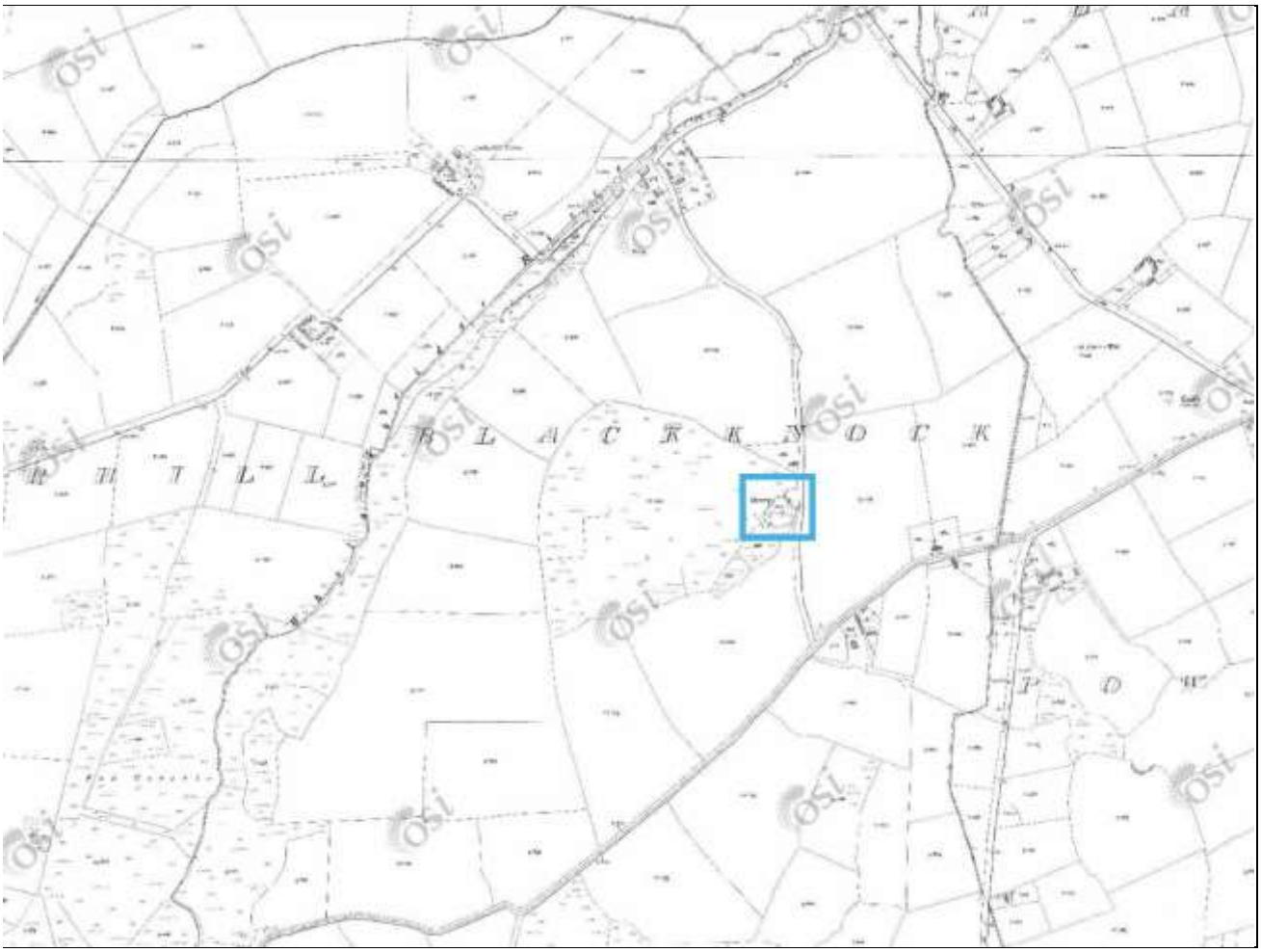
The facility was expanded in 1988 with the construction of the two-story building for the 'Continental Cheese' factory in the western portion of the site which was operational for cheese production from 1988 to 2005. This factory included a cheese production area, cheese treatment and storage areas, chemical stores and brine storage tanks.

Upon review of historical 6-inch first edition, 6-inch last edition and 25-inch Cassini map, a historical quarry was identified in the central section of the site (where bedrock outcrops) in the 25-inch map as shown in Figure 5.8.

The review of Aerial maps from 1995 to 2013 revealed that the overall land use has not changed since 1995 (OSI, 2025).

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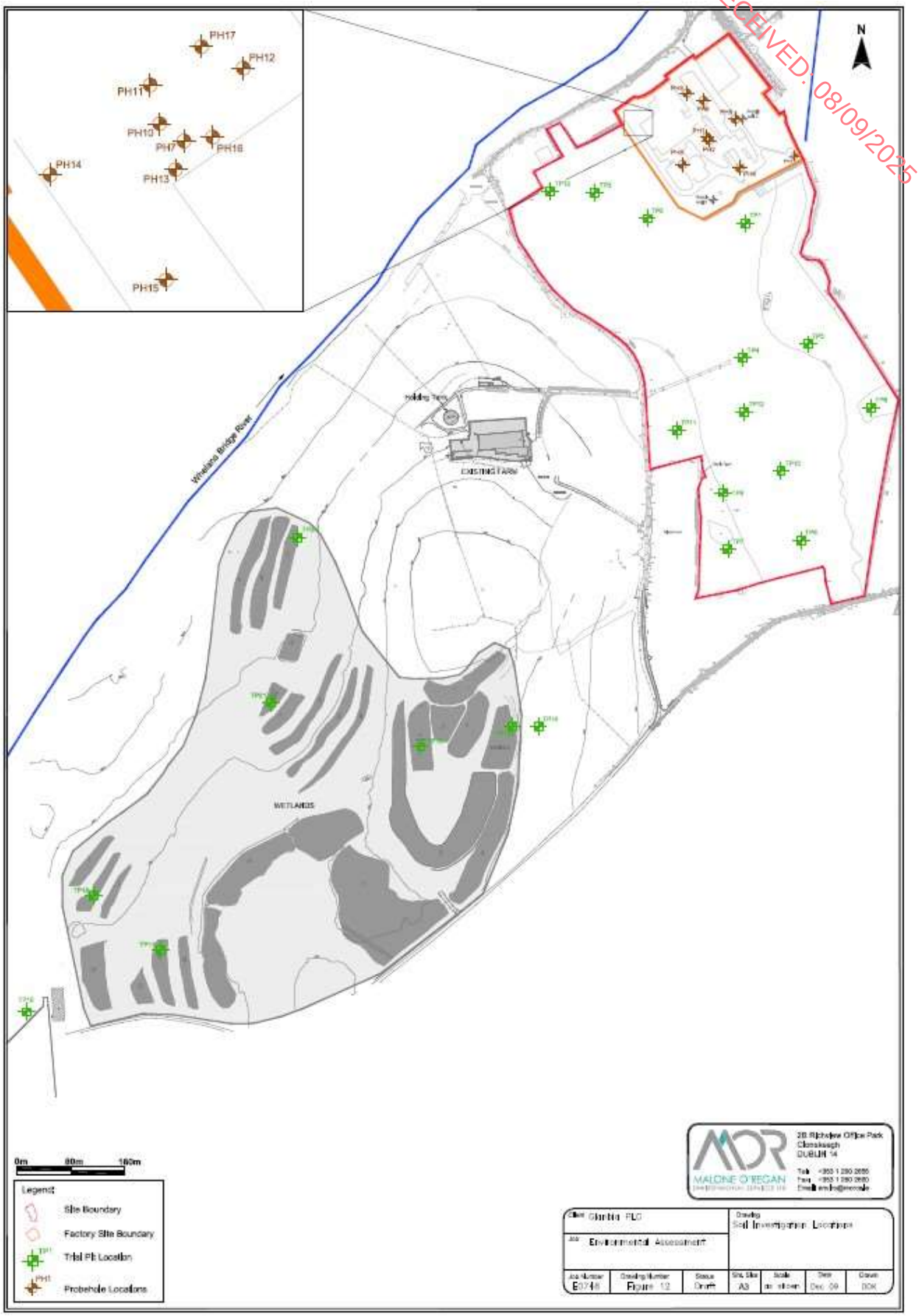
Figure 5.8 Historical Quarry, 25inch Cassini (OPW, 2025)



5.3.10 Historical Site Investigation and Soil Quality

An intrusive ground investigation was conducted by Malone O'Regan (MOR) between July and November 2009. The site investigation comprised 21no. trial pits and 17no. probeholes shown in Figure 5.9.

Figure 5.9 Site Investigation Location Plan (OPW, 2025)



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The trial pits were excavated to depths ranging from 0.4 mbgl to 5.1mbgl while the probeholes were drilled to depths of 1.1mbgl to 4.9 mbgl.

Soil sampling and laboratory analysis was carried out as part of the investigation in accordance with best practice and BS standards. Samples were screened for presence of VOC's using a PID.

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5.3.10.1 Visual and Olfactory Observations

5.3.10.1.1 Surface

The brownfield portion of the site (Northeastern section) was noted as being in good condition with only limited evidence of surface contamination observed across the site. Surface contamination consisted of localised areas of hydrocarbon staining on surfaces adjacent to some of the aboveground fuel tanks and the refuelling areas (PH1, PH2).

There was no evidence of any surface contamination on the greenfield portion of the site.

5.3.10.1.2 Sub Surface

Visual and olfactory evidence of contamination in the subsurface and soil was identified at a limited number of locations, generally adjacent to the former fuel storage areas (PH1 0.3-0.4m, PH2 0.6-1.6m and PH13 0-0.8m).

5.3.10.2 PID Screening Results

PIO readings of 0ppm were reported for all samples collected from the greenfield portion of the site and low PIO readings, typically less than 1ppm were recorded for the majority of samples collected from the brownfield portion of the site and the ICW and farm. Slightly higher readings ranging from 1ppm to 20ppm were generally associated with samples collected from soil containing organic detritus (e.g. PH5 1.05m 18.1ppm). These results indicate a general absence of volatile contaminants in the subsurface. Higher PIO readings in excess of 20ppm were reported for samples collected from adjacent to the fuel storage areas (PH2) ranging from 67.3ppm to 105ppm. These readings were recorded for soil samples with visual (e.g. iridescence/sheen, staining) or olfactory evidence of contamination.

5.3.10.3 Soil Analytical Results

As part of the site investigations carried out Malone O' Regan (MOR) between July and November 2009, soil samples were taken from trial pits and probeholes. Based on visual and olfactory observations and PID results, samples were selected and analysed for a broad range of potential contaminants based on the surrounding land use, site history and current operations at the time. The analytical suite included the following parameters:

- metals including arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel and zinc;
- indicators including pH, electrical conductivity (EC), chloride, sulphate and fluoride;
- nutrients including nitrate and nitrite, ammoniacal nitrogen, phosphorous and potassium; and
- total petroleum hydrocarbons (TPH) as TPH Criteria Working group (CWG) and mineral oil;
- volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene and total xylenes (BTEX) and semi-volatile organic compounds (SVOCs) including phenols and phthalates;
- polycyclic aromatic hydrocarbons (PAHs); and
- fraction organic carbon.

The assessment criteria used included the following:

- United Kingdom Soil Guideline Values (UKSGVs) for Commercial land use (DEFRA and Environment Agency 2009);
- Dutch Guidelines for Target Values, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination (Ministry of Housing, Spatial Planning and Environment, 2000).

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A summary of the results for the greenfield and factory portions of the site is presented below. It is of note that Dutch Target Values are not currently used as best practice however the historical results are indicative of the soil quality across the developed area of the site and surrounding lands. When results are compared with current guidance and LQM S4ul, it can be concluded that all the parameters tested during laboratory analysis were under the permitted limits for commercial development.

5.3.10.3.1 Indicators and Inorganics

Reported levels of indicator parameters (pH, electrical conductivity and salinity) were similar for samples from both the brownfield and greenfield portions of the site and are considered to be representative of background uncontaminated site conditions. Slightly higher concentrations of sodium and chloride relative to what are considered as background concentrations (<103mg/l as Na and <25mg/l as Cl respectively) were reported for a limited number of samples collected from the factory portion of the site (PH3, PH7 and PH9). These elevated concentrations were identified at areas where brine was historically used and stored at the site.

In general, the reported concentrations of indicator and inorganic parameters were for samples collected off-site at the ICW and farm were similar to baseline site conditions.

5.3.10.3.2 Nutrients

Reported levels of nutrients including nitrogenous, phosphorous and potassium parameters were generally similar for all samples collected from the site. An isolated occurrences of nitrate and nitrite at slightly higher concentrations was reported for one sample at PH11 0.1-0.3m (42.73mg/l NO3 and 0.46mg/l NO2) In general, the nutrient concentrations of samples collected off-site were similar to those for on-site samples with the exception of one occurrence of slightly elevated nitrate and nitrite at TP19 1.0-1.1m (47.31mg/I NO3 and 0.7mg/l NO2).

In the absence of specific guideline values the reported levels of nutrients, including the slightly higher values are considered to be typical of background conditions for an agricultural land use.

5.3.10.3.3 Metals

Reported concentrations of metals for samples submitted tor analysis were generally below the relevant assessment criteria from the UKSGVs and Dutch guidelines for all samples collected on-site. However, reported concentrations of a number of metal parameters were detected at concentrations in excess of the relevant Dutch Target Values (DTVs), but below the relevant Dutch Intervention Value (DIV) for barium cobalt copper, lead and zinc.

Reported concentrations in excess of the DTV but below the (DIV) tor barium (160mg/kg and 625mg/kg respectively) were noted for PH7 1.5-1.6m (183mg/kg) and PH13 0.1-0.3m (176mg/kg) and zinc (140mg/kg and 720mg/kg respectively) at PH1 0.6m (152mg/kg).

Reported concentrations of cobalt and copper in excess of the DTVs (9mg/kg and 36mg/kg respectively) but considerably lower than the DIVs (240mg/kg and 190mg/kg respectively) were reported for the majority of samples collected and ranged from 11mg/kg (PH2 0.6m) to 23mg/kg (PH4 0.3m) for cobalt and from 37mg/kg (TP3 0.3m) to 90mg/kg (PH4 0.3m) for copper.

Reported metals results for samples collected off-site were generally similar to those for on-site locations and below the relevant DTVs. However, reported concentrations in excess of the DTV but below the DIV

for zinc at TP19 0.4-0.5 (143mg/kg) and lead (85mg/k and 530mg/kg respectively) was reported for TP16 0.4-0.5m (94mg/kg) and TP191.0-1.1m (32mg/kg).

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While there are a number of concentrations of metals in excess of the Dutch Target Values, these concentrations are considerably lower than the relevant Dutch Intervention Values which are considered to be indicative of contamination. Therefore, given that the identified metals were below the relevant UKSGVs and DIVs, soil at the site has not been significantly impacted with metals.

5.3.10.3.4 Petroleum Hydrocarbons

Some low levels of the petroleum hydrocarbons MTBE, BTEX, mineral oil in excess of relevant laboratory method detection limits (MDL) were identified at areas adjacent to some of the former fuel storage/refuelling areas (PH1, PH2, PH4, PH7), laboratory waste storage (PH7) and effluent storage/pumping areas (PH5) within the factory portion of the site. The levels of the detected hydrocarbon parameters were generally significantly below the relevant guideline values. The exception being a single occurrence of mineral oil (5866mg/kg) interpreted as degraded diesel at PH2 reported in excess of the DIV of 5000mg/kg. Reported mineral oil concentrations were below MDL for samples collected from below (PH2 1.9-2.0m) and adjacent to this sample point (PH1 0.6m) confirming that the lateral and vertical extent of this contamination was determined to be confined to a localised surface area.

5.3.10.3.5 Polycyclic Aromatic Hydrocarbons (PAHs)

Reported concentrations of PAHs were reported below MDL for samples collected on- site submitted for analysis, with the exception of the detection of phenanthrene (1401µg/kg) at PH2 (0.6m), which is associated with the isolated occurrence of mineral oil. Regardless, while the reported PAHs for this sample exceed the DTV (1000µg/kg), the reported PAH (10) concentrations are below the relevant risk assessment criteria (DIV 40,000µg/kg).

5.3.10.3.6 Phenols

Phenol compounds were not detected in any samples submitted for analysis at levels above the relevant MDLs.

5.3.10.3.7 Volatile Organic Compounds (VOC) and Semi-Volatile Organic Compounds (SVOC)

Reported concentrations of VOCs and SVOCs for samples submitted for analysis were generally below the relevant MDLs. However, for a single sample (PH2-0.6m) a limited number of voes (1,3,5-trimethlylbenzene, 1,2,4-trimethlylbenzene, sec-butylbenzene, 4- isopropyltoluene) and SVOCs (Tentatively Identified Compounds-TICs) were reported at low levels in excess of relevant MDLs, these compounds are considered to be associated with the isolated occurrence of mineral oil at this location.

5.3.10.3.8 Pesticides

Reported concentrations of organo-phosphorous and organo-chlorine pesticide compounds were below relevant MDLs for all samples submitted for analysis.

5.3.11 Conceptual Site Model

Based on available data, AWN has developed a conceptual site model (CSM) in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development.

The GSI/ Teagasc mapping shows that the soil type beneath the site comprises predominantly a combination of Poorly Drained Mineral soils in the northeastern section of the site – River Alluvium and Well Drained Mineral Soils in southwestern section of the site- Fine loamy drift with igneous & metamorphic stones.

The subsoil underlying the site predominantly comprises of tills from acidic volcanic rocks while the northeastern section of the site is underlain by tills from Devonian sandstone.

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The GSI presently classifies the aquifer underlying the proposed development site with several vulnerability classifications. The eastern section of the proposed development site is classified by the GSI as having 'Moderate' (M) to 'High' (H) vulnerability. The western portion of the proposed development site is classified as having 'Extreme' (E) to 'Rock at or Near Surface or Karst' (X), where a higher elevation is encountered, and bedrock outcrops are mapped. As such there is a potential for a source-pathway-linkage to the underlying aquifer in the event of a leak/accidental discharge on site.

A preliminary Tier 1 risk assessment was carried out by MOR in December of 2009 which takes into account the site condition at that time and a proposed future commercial/industrial use of the site. Only one soil sample of a total of 21 collected from the site exceeded the conservative Tier 1 assessment criteria. This was a near surface sample in the brownfield portion of the site at PH2 (0.6m) which slightly exceeded the Tier 1 criteria for mineral oil and has been confirmed to be isolated and associated with a historical spill. It has also been confirmed that this isolated exceedance has not impacted on groundwater quality at the site. Therefore, in the context of this risk assessment this isolated exceedance is not considered to be an issue of concern and there are no identified risks associated with residual soil at either the brownfield or greenfield portions of the site.

Based on the findings of this risk assessment, residual soil at the site would not present a constraint to the future development of either the greenfield or brownfield portions of the site.

The maximum proposed excavation is 4.5mbgl.

5.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the proposed development. Therefore, it should be read in conjunction with the full development package.

For a more comprehensive understanding of the proposed development, please refer to Chapter 2 'Description of the Proposed Development' of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

5.4.1 Demolition Phase

Some demolition is required within the former factory site comprising 24,100sq.m (approx.) assuming 0.5m deep across the area gives 12,050cu.m waste. Assuming 2.3t/cu.m (some is concrete some is asphalt) this will result in approx. 27,715t of waste for disposal before construction works can begin. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development.

5.4.2 Construction Phase

The activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the land, soils and geological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the proposed development.

5.4.2.1 Site Levelling and Excavations

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Table 5-2 Cut and Fill Balance (Atkinsrealis)

Surface	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Site Cut & Fill	214811.570	87918.951	126892.619
Ponds Volume	23048.794	1.840	23046.954
Infiltration trenches Solar Farm	6188.113	0.000	6188.113
Total	**244,048.477**	**87,920.791**	**156,127.686**

Approximately 46,838m^3 of material needing to be removed and transported off site for licenced disposal or classed as a by -product under Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended. c. 109,289 m^3 is expected to be being reused on site for landscaping and berms.

Excavation of rock will primarily be undertaken beneath the proposed Energy Centre where shallower rock is expected.

Minimal excavation works will be required for the construction of the proposed solar farm on Blackknock Hill.

The proposed development will require the construction of a bridge across the Whelanbridge Trib 1 EPA river waterbody, to facilitate the new access roads off the R680 and R681 regional roads. The proposed bridge typical details and sections are presented in the civil engineering drawings. The final bridge will be designed in accordance with OPW and Local Authority requirements as well as being designed for the 100yr flood event with a minimum of 300mm freeboard. It is proposed to use 800mm deep beams spanning approximately 20m with 200mm precast flat top and road constructed on this. The beams will sit on cast insitu abutments which will sit on a piled foundation. The construction does not require any instream works and a method statement is included in the CEMP to ensure protection of water quality during construction works.

Addition site investigation is planned as part of preconstruction works to confirm foundation design. If ground conditions are good, a Pad Foundation solution will be utilised to transfer heavy column loads to suitable soil strata below. If ground conditions are poor a Pile solution will be utilised to transfer heavy column loads to suitable soil strata or rock below. A soil stabilisation option may be viable pending a more detailed site investigation and soil appraisal.

Depending on the time of year development works are carried out, local minor dewatering may be required during excavation works and groundworks at the proposed development site i.e. at the location of the new village centre and three (3) no. ICT buildings. During the site investigations carried out by Malone O'Regan (MOR) in 2009, perched groundwater was encountered as minor seepages/saturated soil at depths ranging from 0.2m BGL (beneath the proposed ICT buildings) to 4.9m BGL (c. 200m west of the proposed energy centre). The perched water was generally associated with granular material or top of weathered bedrock. Bedrock was encountered at the site 9.0m BGL in the north-east of the site where the proposed village centre is located, therefore, groundwater is not anticipated to be encountered during excavation works at this location.

5.4.2.2 Storage of soils/aggregates

The employment of good construction management practices and full adherence to the Construction & Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands

and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site.

Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

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5.4.2.3 Storage of hazardous material

Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

5.4.2.4 Import/Export of Materials

There will be a requirement for deliveries and refuelling of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Refuelling will be completed in accordance with the best standard practice refuelling procedure. To support the construction of proposed roads, car parks, and buildings, additional fill material may need to be imported.

A 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil removed will be re-used on site for backfill. Any surplus topsoil, subsoil and bedrock material will be transported off site and disposed of at a fully authorised soil recovery site or licenced landfill based on the waste soil classification.

5.4.3 Operational Phase

The proposed development characteristics which relate to the land soils and geology environment during operation are summarised below.

There is no required bulk diesel store on site rather back up generators will be fuelled by hydrotreated vegetable oil (HVO) which is biodegradable if a spill/leak occurred to ground.. The required HVO to operate the datacentre back up generators will be supplied by belly tanks (c. capacity 25m^3 x 20 gensets per building). Total HVO storage will be a maximum of 4500m^3. The Energy Centre will be supplied from 6 no. 500 m^3 tanks.

In addition, storm drainage from the generator yards is drained through an oil interceptors to treat any accidental hydrocarbon vehicle leaks and HVO leaks. interceptors are also located above and below the attenuation pond i.e. prior to stormwater discharging from the site.

The development will result in an increase in hardstand which will reduce the local recharge to ground and a loss of land viable for agricultural use.

5.5 Potential Impacts of the Proposed Development

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An analysis of the potential impacts of the Proposed Development on the land, soils and geology environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 5 and 6 of the EIA Report. Mitigation measures included in the design of this project to address these potential impacts are presented in Section 5.6.

5.5.1 Demolition Phase

Some demolition is required within the former factory site comprising 24,100sq.m (approx.) before construction works can begin. The likelihood of significant effects on the land, soils and geology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of significant excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the land and soils is minimal and no significant effects on the land's composition, stability, or fertility are anticipated.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology preserving their integrity and minimizing any potential environmental consequences. In the absence of mitigation, the effect on land, soils and geology is likely to be ***short-term, imperceptible*** and ***negative.***

Refer to Chapter 15– Waste of this EIAR for further information on predicted on and off-site reuse, recycle and disposal rates for demolition waste.

5.5.2 Construction Phase

5.5.2.1 Potential impacts on Land, Soils and Geology

Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the material will be re-used on site for backfill Any surplus material will be transported off site and disposed of at a fully authorised soil recovery site. It is predicted that Approximately 46,838 m^3 of material needing to be removed and transported off site and c. 109,289 m^3 being reused on site for landscaping and berms. Excavated material will be disposed of at a licenced facility or if suitable the material may be classed as by-product under Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended. while c. 109,289 m^3 of material will be re-used as fill material. To support the construction of proposed roads, car parks, and buildings, additional fill (sands and gravels) material will need to be imported.

There is potential for shallow soils and groundwater to become locally contaminated with pollutants associated with construction activity as the aquifer vulnerability is "'*Rock at or near Surface or Karst*" (X) for the majority of the site and lands to the immediate north and west. The south and eastern portion of the site is classified as "*Extreme*" (E). To the immediate south of the site the GSI classifies the aquifer vulnerability as being "*High*" (H). The potential main contaminants include:

- Pollution due to discharges or spillages during the construction phase;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage
  - Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

As stated above, the excavation of topsoil, subsoil and rock and near-surface rock head will be required for levelling of the site. Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area will increase the aquifer vulnerability during construction prior to paving and installation of stormwater drainage and services. Capping of significant areas of the site by

hardstand/building following construction and installation of drainage will minimise the potential for contamination of the aquifer beneath the site.

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Local minor dewatering may be required during excavation works and groundworks. However, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site due to the discrete nature of fracturing within the bedrock and lengthy pathway of flow allowing time for attenuation and dispersion.

In the absence of mitigation measures the potential impacts during the construction phase on land, soils and geology are ***negative***, ***slight*** and ***short term.***

5.5.2.2 Potential Impacts on Human Health and Populations

A reduction in soil quality via historical or unmitigated pollutants entering the soil has the potential to lead to negative impacts on human health during construction Hydrocarbons and petroleum products for example have a risk for humans by inhaling the fumes / dust from contaminated soil. Depending on the type of contaminant and the level of exposure, soil contamination can have serious health implications. As discussed above, soil analysis was carried out by MOR (2009) which identified several contaminants in the brownfield site. However, a soil quality risk assessment for suitability for use against commercial development was carried out for the identified contaminants. Only one soil sample of a total of 21 collected from the site exceeded the conservative Tier 1 assessment criteria. This was a near surface sample in the brownfield portion of the site at PH2 (0.6m) which slightly exceeded the Tier 1 criteria for mineral oil and has been confirmed to be isolated and associated with a historical spill.

Any excavation works within the brownfield site during the construction phase should be carefully monitored by a qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil will be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method.

In the absence of mitigation measures the potential impacts to human health during the construction phase on land, soils and geology are ***negative***, ***not significant*** and ***long term***.

5.5.3 Operational Phase

5.5.3.1 *Potential impacts on Land, Soils and Geology*

There will be no requirement for excavation of topsoil, subsoil and near-surface rock head during the operational phase. The majority of the site will be capped by hardstand/building during construction and installation of drainage will minimize the potential for contamination of the aquifer beneath the site during the operational phase.

Therefore, there will be no requirements for mitigations for land soil or geology post construction phase of the development.

Therefore, on this basis in the absence of mitigation measures the potential impacts during the operational phase on human health and populations due to the potential for contamination of soils are ***neutral***, ***imperceptible*** and ***long term***.

5.5.3.2 Potential Impacts on Human Health and Populations

There are no sensitive economic features, potential contamination or historical geological features at the site. During the operational phase of the Proposed Development there is no potential for impact on human health and populations due to changes in land, soil, and geology.

Therefore, on this basis in the absence of mitigation measures the potential impacts during the operational phase on human health and populations due to the potential for contamination of soils are ***neutral***, ***imperceptible*** and ***long term***.

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5.6 Mitigation Measures

5.6.1 Demolition Phase

To facilitate the development, limited demolition works are required. The demolition works of the proposed development are limited to surface-level activities and do not involve any significant subsurface works. As a result, the impact on the land and soils is minimal.

The demolition process focuses on dismantling and removing structures, buildings and infrastructure to accommodate the new development and facilitation works, without disturbing the underlying soil or altering the landscape. This approach ensures that there are no significant effects on the land's composition, stability, or fertility. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licensed waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate.

Refer to Chapter 15 – Waste of the EIA for further information on predicted on demolition phase mitigation in terms of off-site reuse, recycle and disposal rates for demolition waste.

5.6.2 Construction Phase

5.6.2.1 Construction & Environmental Management Plan

A Construction & Environmental Management Plan (CEMP) has been prepared in respect of the proposed development. The CEMP outlines and explains the construction techniques and methodologies which will be implemented during construction of the proposed development.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The CEMP will set out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CEMP will be implemented and adhered to by the construction Contractor

and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

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During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

5.6.2.2 Soil Excavation, Removal and Infill

Material that is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as soil environments. Given the previous site uses, there is potential to encounter contaminated material. All excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.
Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. No stockpiling will be permitted within the riparian zone or within the 20 m buffer zones around ponds (Ref Figure KMM-HYP-ZZ-ZZ-DR-A-0100).

Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

To minimise dust during construction the following mitigation measures will be implemented during the construction phase.

- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Silt reduction measures on site will include a combination of silt fencing and settlement measures.
- It is proposed to install a french drain surrounding the solar farm area on Blackknock Hill and other water quality control measures i.e. silt traps, 20m buffer zones surrounding the 2 no. ponds on site will be installed during construction.
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate,
- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.

- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.
- Any surface water run-off collecting in excavations will likely contain a high sediment load. This will not be allowed to directly discharge to any stormwater sewer, drainage ditch or watercourse.

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5.6.2.3 Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within any riparian or buffer zone. Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer subject to agreement with Uisce Éireann (Irish Water).

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the site will be suitably trained in the implementation of the procedures.

5.6.2.4 Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water (and groundwater) systems:

- Designation of bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used, the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit and relevant operatives must have spill response training;
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

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Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated bunded refuelling areas, which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

5.6.2.5 Human Health and Populations

It has been established (refer to Section 5.5.1.2 above) that there is an isolated exceedance in the brownfield site due a historic spill. However, the exceedance is identified in a near surface sample and all excavated material from the brownfield site will be disposed off site.

As there is no source pathway linkage, no mitigation is required.

5.6.2.6 Environmental Procedures

There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage of all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.

5.6.3 Operational Phase

5.6.3.1 Land, Soils and Geology

The required HVO to operate the generators, will be contained within individual double lined tanks or 'belly tanks' within the container at each generator. The generator yard will be drained through an oil interceptor. The tanker loading area will be drained to the foul sewer.

The proposed incorporation of hardstand area and the use of SUDs design measures i.e. 4,500m^3 attenuation pond (including a forebay berm and a permanent pond feature), Pollutant traps and bypass hydrocarbon interceptors installed upstream of all attenuation systems and interceptors installed in fuel delivery areas will have a minor effect on local recharge to ground; however, the impact on the overall groundwater regime will be insignificant considering the proportion of the site area in relation to the total aquifer area.

Therefore, the risk of accidental discharge has been adequately addressed through design. No further mitigation is required.

Refer to Chapter 6 (Hydrology and Hydrogeology) of the EIAR for further information on the proposed SUDs design measures.

5.6.3.2 Human Health and Populations

As there is no source pathway linkage, no mitigation is required.

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5.7 Monitoring

5.7.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate.

No monitoring is required.

5.7.2 Construction Phase

During construction phase the following monitoring measures will be implemented:

- Regular inspection of water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils to ensure correct disposal
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc) to minimise potential for discharge to ground

5.7.3 Operational Phase

Maintenance of the surface water drainage system, including interceptors, and foul sewers is recommended to minimise any accidental discharges to the underlying soils.

5.8 Residual Effects of the Proposed Development

5.8.1 Demolition Phase

A carefully planned approach during the demolition phase in particular waste management, as set out in Section 5.10.2 and full adherence to the RWMP presented in Appendix 10.1 and Chapter 15 –Waste of the EIAR, will ensure that the predicted effect on the land, soils and geological environment will be ***short-term, imperceptible*** and ***neutral***. Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered ***negligible***.

5.8.2 Construction Phase

5.8.2.1 Land, Soils and Geology

The implementation of the mitigation and monitoring measures detailed in Section 5.6.1 and 5.7.1, will ensure that the potential impacts on land, soil and geology during the construction phase are adequately mitigated. The residual effect on land, soils and geology during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

Following the TII criteria (refer to Appendix 5.1) for rating the magnitude and significance of impacts on the soils and geology related attributes, the magnitude of impact is considered ***negligible***.

5.8.2.2 Human Health and Populations

As there is no source pathway linkage, there are no potential impacts on human health and populations during the construction phase. The residual effect on human health and populations during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term.***

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5.8.3 Operational Phase

5.8.3.1 Land, Soils and Geology

The implementation of the mitigation and monitoring measures detailed in Section 5.6.2 and 5.7.2, will ensure that the potential impacts on land, soils and geology once the proposed development is constructed and operational are adequately mitigated. The residual effect on soils and geology during the operational phase is considered to be ***neutral, imperceptible*** and ***short-term.***

Following the TII criteria (refer to Appendix 5.1) for rating the magnitude and significance of impacts on the soils and geology related attributes, the magnitude of impact is considered ***negligible***.

5.8.3.2 Human Health and Populations

As there is no source pathway linkage no mitigation is required. The residual effect on human health and populations during the operational phase is considered to be ***neutral, imperceptible*** and ***short-term.***

5.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the proposed development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

5.9.1 Demolition Phase

The potential residual effects on the land, soils and geological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the land, soils and geological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Any developments proposed in the area will have to adhere to their own CEMP and Mitigation plans. There are no pathway connecting the sites in terms of land, soils and geology.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 5.6 will ensure the residual effect on the land, soils and geology environment during the demolition phase is likely to be ***short-term-imperceptible-neutral.***

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5.9.2 Construction Phase

In relation to the potential cumulative impact on land, soil and geology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016).

The implementation of mitigation and monitoring measures previously detailed above in section 5.6.1; and 5.7.1 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the land, soils and geology environment during the construction phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

5.9.3 Operational Phase

In relation to the potential cumulative impacts on land, soils, and geology during the operational phase, the risk of accidental spills, leaks, and discharges into the underlying soil. However, the mitigation measures outlined in Section 5.6.2 will be implemented to prevent and control these risks, ensuring the protection of the soil and the underlying bedrock aquifer.

The implementation of mitigation and monitoring measures detailed in Section 5.6.2; as well as the compliance of permitted developments listed in Appendix 2.1 of Chapter 2 and any future permitted developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the land, soils and geological environment during the operational phase of the proposed development.

The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term.***

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Chapter 6 – Hydrology & Hydrogeology

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6. HYDROLOGY & HYDROGEOLOGY

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6.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the proposed development will have on hydrology (surface water) and hydrogeology (groundwater). In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

6.2 Methodology

6.2.1 Relevant Legislation & Guidance

This impact assessment was undertaken having regard to the following legislation and guidance:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009, previously NRA). The TII criteria for rating the hydrogeological and hydrological related attributes are presented in Appendix 6.1 and 6.2 of this EIAR.
- Water Framework Directive 2000/60/EC.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation, regulations and guidelines. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003).
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016).
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010).
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988.
- Local Government (Water Pollution) Acts 1977-1990.
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.
- Water Services Guidelines for Planning Authorities Draft (Department of Housing, Planning and Local Government, 2018).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

6.2.2 Sources of Information

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Desk-based hydrological and hydrogeological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Latest EPA Envision water quality monitoring data for watercourses in the area.
- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government, 2018).
- Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW, 2009).
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie).
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports.
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Waterford City and County Development Plan 2022-2028 – Strategic Flood Risk Assessment (SFRA, 2022-2028).

Site specific data was derived from the following sources:

- Various design site plans and drawings, as submitted with this planning application.
- AtkinsRéalis Ireland Limited Stage 1 Flood Risk Assessment Report
- AtkinsRéalis Ireland Limited Engineering Report
- AtkinsRéalis Ireland Construction Environmental Management Plan
- Malone O' Regan (MOR) Environmental Site Assessment Report (December,2009).
- Various design site plans and drawings; and
- Consultation with design architects and engineers.

The principal attributes (and effects) assessed include the following:

- Water Framework Directive (WFD) Status and potential for increased risk of deterioration of this status due to the activities of the site.
- River and aquifer water quality in the vicinity of the site (where available).
- Surface, transitional and coastal watercourses near the site and potential impact on surface water quality arising from Proposed Development related works including any discharge of surface water run-off.
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.
- High-yielding water supply springs/ wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the Proposed Development.
- Classification (regionally important, locally important etc) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development e.g. removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality.
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and,
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporarily.

6.2.3 Forecasting Methods & Difficulties Encountered

A previous site investigation (2009) was relied on for assessment of soil quality beneath the former Kilmeaden Cheese Plant. A walkover confirmed no evidence of change in site conditions since this assessment was undertaken. No borehole log data was available from this study. Site investigation will be undertaken as part of pre construction works and as such the assessment is based on expected cut and fill and design foundations provided by development engineers (Atkins Realis).

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6.3 Receiving Environment

6.3.1 Existing & Historical Land Use & Topography

The proposed development is located in Kilmeaden, Co Waterford and comprises a number of distinct but connected areas including a new village centre, a solar farm and rewilding area including grid scale battery storage, and a Technology park (the "proposed development"). The proposed development location lies to the south of the R680, within the townlands of Ballyduff east, Amberhill and Blackknock, Co Waterford.

The site is surrounded primarily by agricultural land to the north south and west and is bounded by Kilmeaden village to the east.

The approximate topographical levels for the proposed site range between 89.0AoD to 15.0mAOD. The site containing a hill known as the Blackknock Hill with the highest point of 89.0mAoD in the centre and the lowest point 15mAoD to the northeast where the main entrance to the old Cheese Factory is located. The site slopes to the north-east towards the Whelanbridge Trib 1 (European Code: IE_SE_16W010400) and south-west towards the Whelanbridge River (European Code: IE_SE_16W010400).

The entire area was greenfield until 1965 when the 'Kilmeaden Cheddar Cheese' factory was constructed on part of the site. This development comprised the main factory building in the eastern portion of the proposed development site which included the cheese production area, boiler house fuelled by natural gas and offices. The raw milk intake silos for this factory were located to the south of the building with an associated truck wash area. Cheese production was carried out at the 'Cheddar Cheese' factory from 1965 to 2005.

The facility was expanded in 1988 with the construction of the two-story building for the 'Continental Cheese' factory in the western portion of the site which was operational for cheese production from 1988 to 2005. This factory included a cheese production area, cheese treatment and storage areas, chemical stores and brine storage tanks.

Surface run-off from the paved non-production areas of the factory was collected and discharged to the Whelanbridge Trib 1 (formerly referred to as the Loughdeheen Stream), run-off from production areas was collected together with process effluent and pumped to the off-site ICW and farm area to the west of the site. The effluent was disposed of via an irrigation system on the greenfield portion of the site and off-site farm from 1966 to 1997. The ICW was developed in 1997 and was fully operational in 2001 and used for effluent treatment and disposal in accordance with standard best practice at the time until 2005 when production at the facility ceased. The site was levelled and further discussion of known ground conditions is included in chapter 5 Soils and Geology.

Figure 6-1 below presents the lands subject to this application indicated by the red line boundary and surrounding land uses.

A review of historical 6 inch first edition, 6 inch last edition and 25 inch Cassini map show three springs were identified in the immediate vicinity of the site. There is one. spring located adjacent to the south-eastern boundary of the site located near the R681 regional road, c. 310m and c. 420m south-west of the previous factory building and immediately south and north of the Whelanbridge River, respectively as shown in Figure 6-2 and Figure 6-3.

A review of aerial maps from 1995 to present revealed that apart from the closure of the plant, the overall land use has not changed since 1995 (OSI, 2025).

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Figure 6-1 Site Location & Drainage & Surrounding Land Use (Google Satellite, 2025)

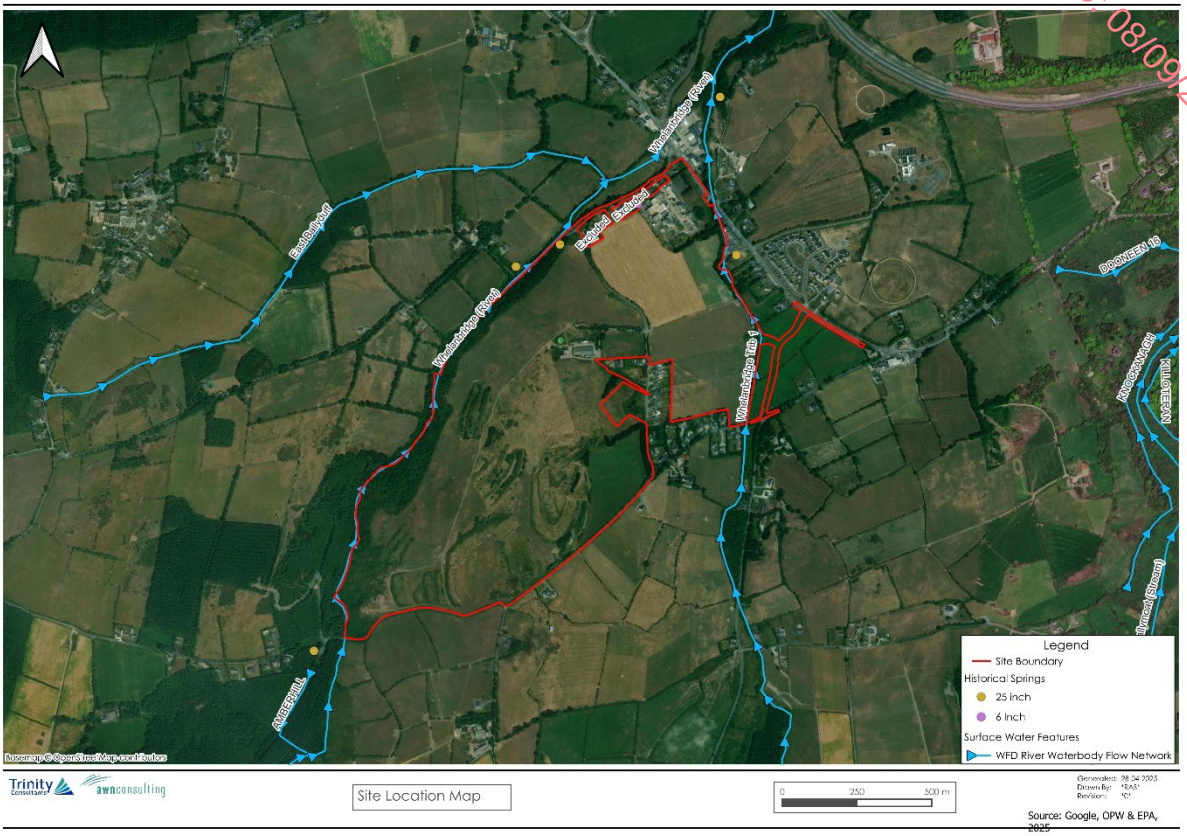
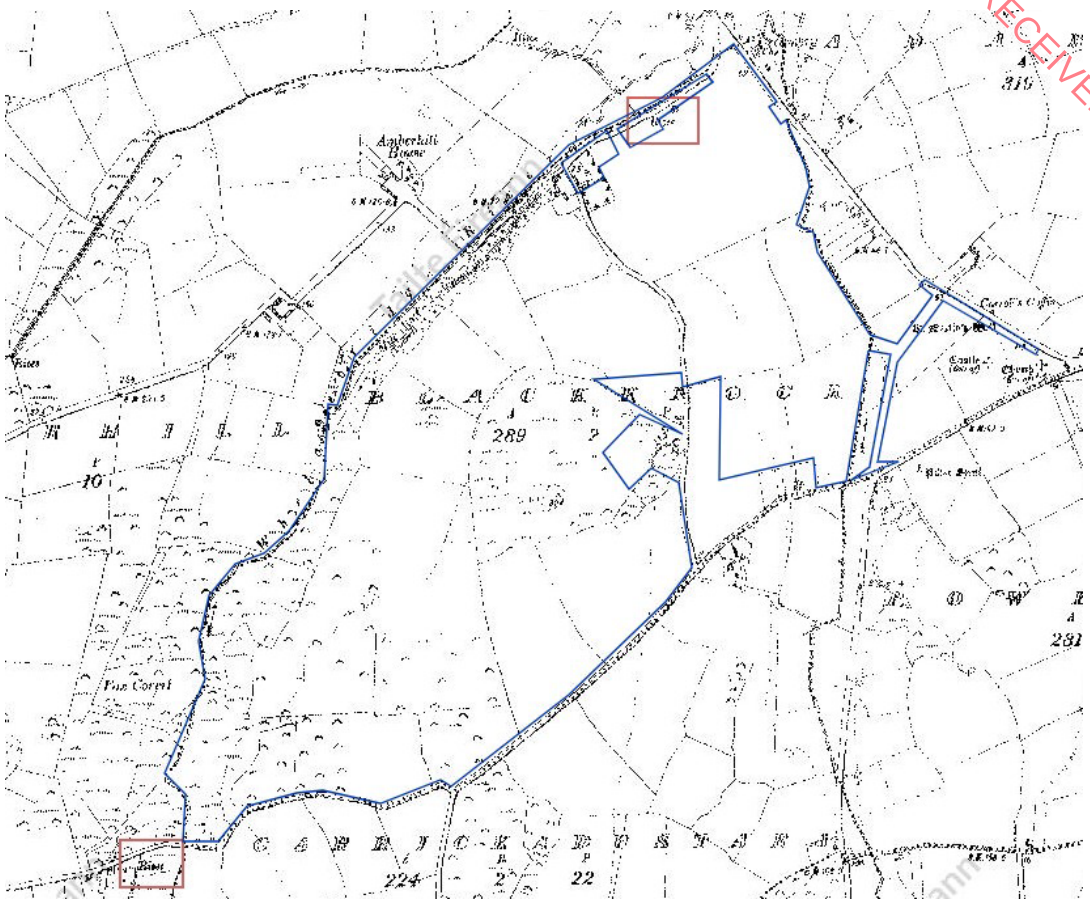
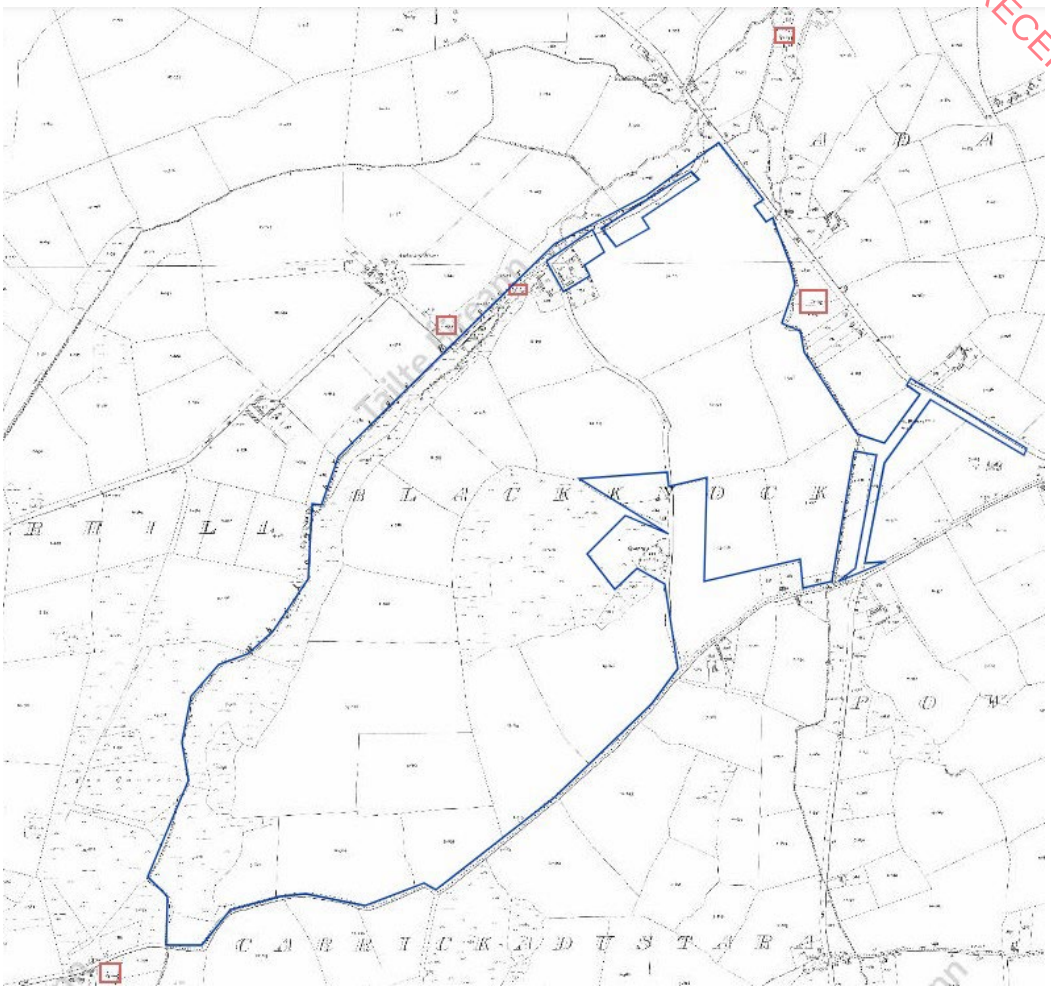


Figure 6-2 Historical Spring Locations- 6inch Last Edition



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Figure 6-3 Historical Spring Locations- 25inch Cassini



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6.3.2 Hydrology

6.3.2.1 Regional Hydrological Environment

The proposed development site is located within the former Eastern River Basin District (ERBD) (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The proposed development site is located in the South Eastern River Basin District (IESE) (Hydrometric Area No. 16).

The proposed development site lies within the Suir Catchment (Catchment ID: 16) and the Dawn [River]_SC_010 Sub-Catchment (Sub-Catchment ID: 16_7). The current EPA watercourse mapping shows two watercourses flowing adjacent to the proposed development site. The Whelanbridge Trib 1 (European Code: IE_SE_16W010400) is located along the north-eastern boundary, flowing in a northerly direction before discharging to the Whelanbridge River c. 330m north-east (linear distance) and c. 520m downstream of the proposed development site. The Whelanbridge Trib 1 is culverted beneath the R680 regional road which bounds the north-eastern portion of the proposed development site. The Whelanbridge River (European Code: IE_SE_16W010400) flows in a north-easterly direction along the western boundary of the site before its confluence with the Whelanbridge Trib 1.

The Whelanbridge River flows north before discharging to the Upper Suir Estuary Transitional Waterbody (European Code: IE_SE_100_0600) c. 915m north-east (linear distance) and c. 1.2km downstream. The

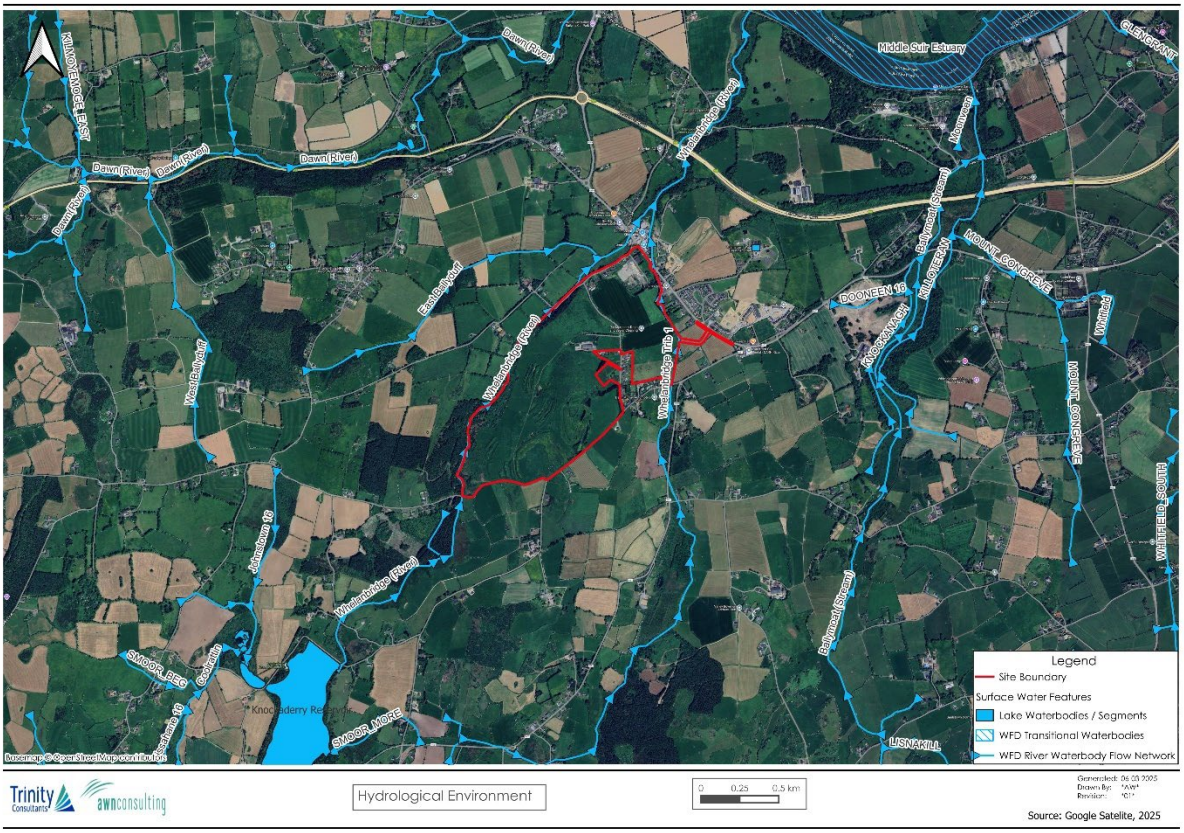
Upper Suir Estuary Transitional Waterbody is located entirely within the Lower River Suir SAC (Site Code: 002137).

To the Easton Blacknock hill, the site comprises multiple fields enclosed and separated by boundaries and internal hedgerows. Site drainage is towards the existing settlement ponds on site and ultimately to the Whelanbridge River (refer to Section 6.3.2.2).

Figure 6-4 below presents the regional hydrological environment as per the latest EPA mapping.

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Figure 6-4 Regional Hydrological Environment (EPA, 2025)



6.3.2.2 Local Hydrological Environment

As stated above, the latest EPA mapping shows two watercourses flowing adjacent to the proposed development site. The Whelanbridge Trib 1 is located along the north-eastern boundary, flowing in a northerly direction before discharging to the Whelanbridge River c. 330m north-east (linear distance) and c. 520m downstream of the proposed development site. The Whelanbridge River is located along the western boundary of the site flowing in a north-easterly direction. The Whelanbridge River originates from the Knockaderry Reservoir located c. 1.38 km south-west (linear distance) and c. 1.6 km upstream of the site.

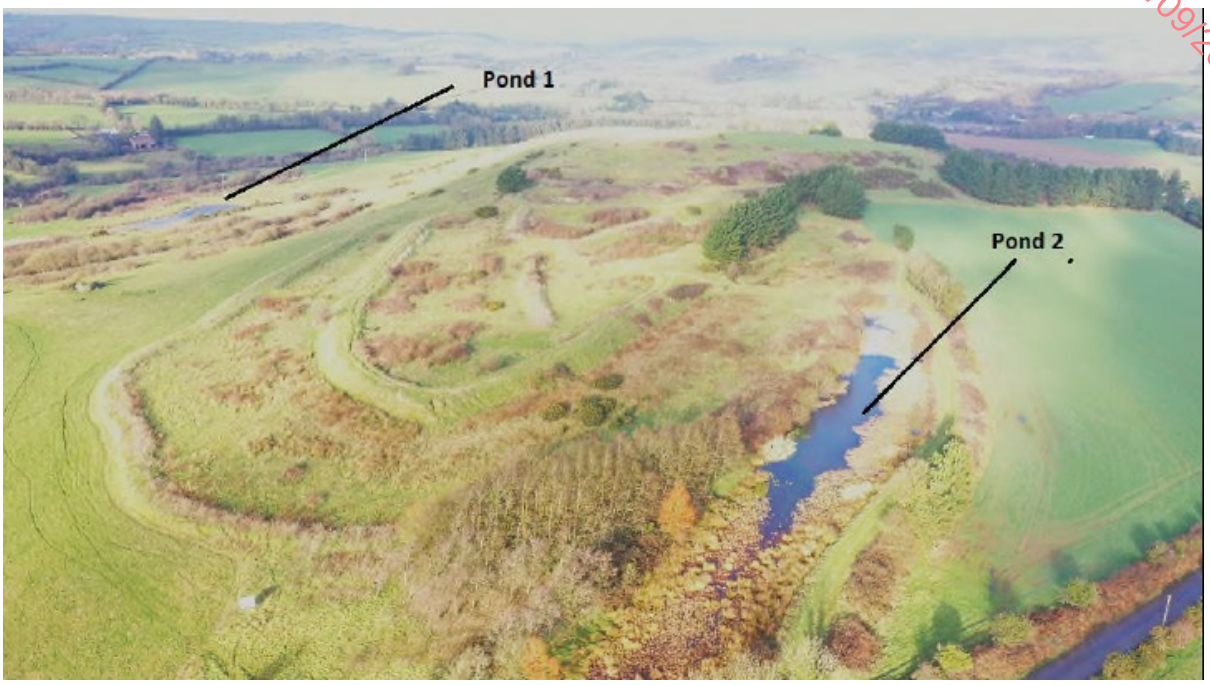
Site walkovers identified features associated with the historical management of milk waste products, previously treated through a series of integrated constructed wetlands. Following the closure of the 'Kilmeaden Cheddar Cheese' factory, the functionality of these water management systems has diminished. Over time, many of these ponds have dried out, transitioning into areas dominated by scrub vegetation. However, two ponds still retain water.

The first pond is situated to the southwest of Blacknock Hill, adjacent to the farm trackway, and is bordered by gorse scrub and improved dry grassland as shown in Figure 6-5. Observations (source: Fers Ecologist) on January 15th 2025 indicate that water from this pond was flowing down Blacknock Hill into a previously

dry pond, demonstrating overland flow across the field and down the slope into the Whelanbridge River. The second pond, is located to the southeast of Blacknock Hill and also contained water during the site walkover on January 15th 2025. The former settlement ponds to the south and east of the site were dry during initial surveys by FERS, but it is possible that they refill following significant rainfall events.

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Figure 6-5 Artificial Ponds and Drainage On Site (Source: FERS, 2025)



6.3.3 Bathing Waters and Recreational Waterbodies

A review of the Environmental Protection Agency's (EPA) online mapping that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters or Bathing Waterbodies located in the vicinity of the site. The nearest bathing waterbody is Tramore Beach (BW ID: IESEBWC110_0000_0100) located >c. 20km south-east of the proposed development site and no hydrological/hydrogeological connection/linkages exist.

6.3.4 Surface Water Quality

6.3.4.1.1 Regional Surface Water Quality

The proposed development is located within the Irish River Basin District, as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The proposed development site is located in the South Eastern River Basin District (IESE) (Hydrometric Area No. 16).

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the first River Basin Management Plan (RBMP) 2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland (Dept. of Housing Local Government & Heritage, Sept 2024) has since been published.

During the development of this plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan

cycle to 2027. During the catchment characterisation, the EPA has carried out an analysis of the likely water quality outcomes that may be achieved as a result of the measures outlined in the third-cycle River Basin Management Plan. The analysis forecasts the number of water bodies that are likely to achieve their 2027 status objectives, and those that are likely to show improvements, so that an assessment can be made of the gap to achieving Water Framework Directive (WFD) environmental objectives. The forecast analysis is a snapshot in time based on the best available information on the measures being implemented as of September 2023. It depends on assumptions being made about how the measures in the plan will be implemented, for example, where measures are voluntary. Improved information on the measures being implemented will allow the forecasts to be further refined over time. The 2021 characterisation assessment identified there were 2,610 water bodies, out of a total of 4,842 water bodies (54%), which had met their objectives. These water bodies require ongoing basic measures to protect water quality. Of the remainder, 1,649 (34% of the total) were categorised as being 'At Risk' of not achieving their objectives and had evidence available to determine the water quality issue(s) and the pressure(s) that needs to be addressed. These water bodies are prioritised in the Plan for measures to restore water quality. The other 583 water bodies are in 'Review', which means additional evidence is required to confirm the nature of any water quality issues and the impacts from any relevant pressures.

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The third cycle river basin management plan (2022-2027) i.e. "Water Action Plan 2024 - A River Basin Management Plan for Ireland" has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the proposed development.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019)
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011);
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988;
- Local Government (Water Pollution) Acts 1977-1990;
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The Whelanbridge Trib 1 and the Whelanbridge River belong to the Whelan's Bridge Stream_010 WFD surface waterbody (European Code: IE_SE_16W010400). The Whelan's Bridge Stream_010 WFD surface waterbody has a most recent WFD surface water status (WFD Period: 2016-2021) of '*Poor*' and its current WFD risk score (3rd risk cycle) of '*At risk*' of not achieving good status. This '*Poor*' status is related to its ecological status or potential, biological status or potential and supporting chemistry conditions. The most

recent Sub-Catchment Assessment (January, 2019) carried out by the EPA on the Dawn[River]_SC_010 Sub-Catchment states the main pressure identified on the Whelan's Bridge Stream_010 WFD surface waterbody is from agriculture, likely attributing to the poor ecological and biological status or potential, particularly invertebrate status or potential (Catchments.ie, 2025).

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The Upper Suir Estuary Transitional Waterbody (European Code: IE_SE_100_0600), is currently classified by the EPA as having '*Bad*' WFD water quality status (WFD Period: 2016-2021) and a WFD risk score (3rd risk cycle) of '*At risk*' of not achieving good status. This '*Bad*' status is related to its ecological status or potential, phytoplankton status or potential and chemical surface water status. The status failure reasons provided by the EPA is a result of Benzo(a)pyrene concentrations. The most recent Sub-Catchment Assessment (September, 2022) carried out by the EPA on the PIL_SC_010 Sub-Catchment (Sub-Catchment ID: 16_27) states that the main pressure on the Upper Suir Estuary Transitional Waterbody is from agriculture.

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

In relation to the proposed development site, the EPA quality monitoring station point in closest proximity to the site is 'as follows:

- Whelan's Bridge' (Station Code: RS16W010400), located c. 915m north-east (linear distance) and c. 1.2km downstream of the proposed development site along the Whelanbridge River. The most recent Q Value Score recorded at this station is in 2023 is 'Q3', which denotes a 'Poor' status and moderately polluted status and unsatisfactory conditions.

6.3.4.2 Local Surface Water Quality

As part of the due diligence site investigations carried out Malone O' Regan (MOR) between July and November 2009, surface water samples were taken from the Whelanbridge River (SW3 and SW4) located along the sites western boundary and the Whelanbridge Trib 1 (SW1) located along the sites eastern boundary. Samples were analysed for a broad range of potential contaminants based on the surrounding land use, site history and current operations at the time. The analytical suite included the following parameters:

- Indicators including chloride, sulphate and fluoride;
- Nutrients including nitrate and nitrite, ammoniacal nitrogen, phosphorous and potassium; and
- Total petroleum hydrocarbons (TPH) as TPH Criteria Working group (CWG) and mineral oil;
- Volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene and total xylenes (BTEX) and semi-volatile organic compounds (SVOCs) including phenols and phthalates;
- Polycyclic aromatic hydrocarbons (PAHs);
- Faecal and total coliforms; and
- Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).

Surface water results were assessed relative to available Irish guideline and legislative standards (at that time) as follows:

- Surface Water Standards (SI No. 272 of 2009).

A summary of the surface water analytical results are presented below.

6.3.4.2.1 Indicators and Inorganics

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Reported concentrations of pH, dissolved oxygen and fluoride met the relevant standards for all samples collected. Elevated levels of BOD in excess of the surface water standard (1.Smg/l) were reported for SW1 (4mg/l), SW3 (8mg/l) and SW4 (7mg/l). The reported concentrations of parameters were similar for both upstream and downstream locations on the Whelan's Bridge River.

6.3.4.2.2 Nutrients

Elevated ammoniacal nitrogen concentrations (0.08mg/l, 0.07mg/l and 0.13mg/l) in excess of the relevant surface water standard (0.15mg/l) were reported for samples collected from SW1 (0.08mg/l) on the Loughdeheen Stream and SW3 (0.07mg/I) and SW4 (0.13mg/l) on the Whelans Bridge River. Given that the elevated concentrations of ammoniacal nitrogen were reported both upstream and downstream of the site and the agricultural landuse of the hinterland with associated nutrient loading such as livestock and fertiliser application to crops, it is likely that the identified elevated concentrations are associated with surface runoff from these agricultural activities rather than on-site sources.

6.3.4.2.3 Hydrocarbons, Phenols. VOCs and SVOCs

Petroleum hydrocarbons, PAHs, phenols, VOCs and SVOCs were reported as below the relevant method detection limits (MDL's) set by the laboratory for all surface water samples collected from the site.

6.3.4.2.4 Pesticides

Selected samples were analysed for organo-phosphorous and organo-chlorine pesticides, the reported results for all compounds were below relevant method detection limits (MDL's) set by the laboratory.

6.3.5 Water Supplies

A review of the Environmental Protection Agency's (EPA) online mapping, which includes the Register of Protected Areas (RPA) established under the Water Framework Directive (WFD), indicates that the Whelan's Bridge Stream_010, for which the Whelanbridge Trib 1 and the Whelanbridge River are located within, is situated within a designated Surface Water Drinking RPA. This classification of drinking water river lines has been delineated in accordance with the European Communities (Drinking Water) (No. 2) Regulations 2007 (SI No. 278/2007). This regulatory framework aims to ensure the protection of water resources utilised for human consumption, thus safeguarding public health and the environment.

A review of the EPA's surface water abstraction register (December, 2024) identified 3 no. drinking water abstraction points located within the Whelan's Bridge Stream_010 (WAB0000023, L218519, Knockaderry 2), (WAB0001902, L122782, Knockaderry Impoundment) and (WAB0002270, L218752, Knockaderry 1). The Environmental Protection Agency (EPA) was consulted on January 9th 2024 and the EPA confirmed on January 10th 2025 that the three drinking water abstraction points are located upstream of the proposed development site.

6.3.6 Flood Risk

The EU Floods Directive (2007/60/EC) required Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. Members States were also required to prepare catchment-based Flood Risk Management Plans by 2018 that will set out flood risk management objectives, actions and measures. The OPW in co-operation with various Local Authorities produced a number of PFRAs which aimed to map out current and possible future flood risk areas and develop risk assessment plans. As part of the CFRAM programme provisional flood maps had been produced by the OPW which have been used in this assessment.

A Stage 1 Flood Risk Assessment (FRA) has been undertaken for the proposed development site by AtkinsRéalis Ireland Limited in January 2025. A copy of the Stage 1 Flood Risk Assessment Report has been submitted as part of this planning application.

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The purpose of the Stage 1 Flood risk identification process is to establish whether a flood risk issue currently exists or may exist in the future. The OPW CFRAM online mapping was consulted to consider the risk of flooding for the site. The Waterford City and County Development Plan 2022-2028 – Strategic Flood Risk Assessment (SFRA, 2023-2029) has not been carried out at the location of the proposed development site.

In relation to the proposed development site, based on Stage 1 Flood risk identification findings the following conclusions can be drawn:

- The GSI groundwater flooding website was consulted however there were no groundwater related flooding illustrated on or near the proposed development site.
- The proposed development site is located c. 1.7km south-west (linear distance) and c. 2.12km upstream of the Upper Suir Estuary Transitional Waterbody (European Code: IE_SE_100_0600) and c. 19.1km north-west (linear distance) and c. > 31km upstream of Waterford Harbour coastal waterbody (European Code: IE_SE_100_0000). As such the proposed development site it is not affected by tidal and coastal water bodies and flooding from these sources is considered negligible.
- The Office of Public Works (OPW) interactive map viewer (http://www.floodinfo.ie/map/floodmaps/) displays the predicted flood extents for both rivers and coastal areas over various return periods. The viewer was consulted in relation to the proposed site location and the information in this area is "under review". From viewing the flood map viewer, it is evident that a small, localised portion of the site is at risk of fluvial flooding from the Whelanbridge River and the Whelanbridge Trib 1.
- The OPW Flood Hazard Mapping website (www.floodmaps.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the site. The Flood Hazard Mapping indicates a recurring flooding at a low point on the L4018 due to inadequate local drainage.

The conclusions of stage 1 flood risk assessment carried out by Atkins Realis are presented below.

- There is historic risk of localised flooding on the L4018 which runs through the site however, the low point associated with this is so small that it does not show up on sections cut through a detailed topographic survey. It is concluded that there is no significant risk posed from this event.
- The majority of the development is within Flood Zone C and a small portion of the development (earthwork embankments) is constructed in flood zones A & B.
- There is localised flooding to the north of the site around the Wheelanbridge tributary. It should be noted that the only construction proposed in this area is the construction of earth embankments and that appropriate compensation storage has been provided. It is concluded that there is no significant residual risk from this.

6.3.7 Designated Sites

The NPWS (2025) on-line database have been reviewed to determine the location of areas of conservation within proximity to the proposed development site, and there are no Special Protected Areas (SPA) established under the EU Birds Directive (79/409/EEC), or Special Areas of Conservation (SAC) established under the Habitats Directive on or within the boundary of the proposed development site. Furthermore, there are no Natural Heritage Areas (NHA), or proposed Natural Heritage Areas (pNHA) established under the Wildlife Acts, 1976 and 2000 (as amended).

The European site in closest proximity and hydrologically connected to the proposed development site is as follows:

- The Lower River Suir SAC (Site Code: 002137), located c. 915m north-east (linear distance) and c. 1.2km downstream of the proposed development site. A hydrogeological connection may also exist to the Lower River Suir SAC through the underlying "*Regionally Important Aquifer – Fissured Bedrock*" (Rf).

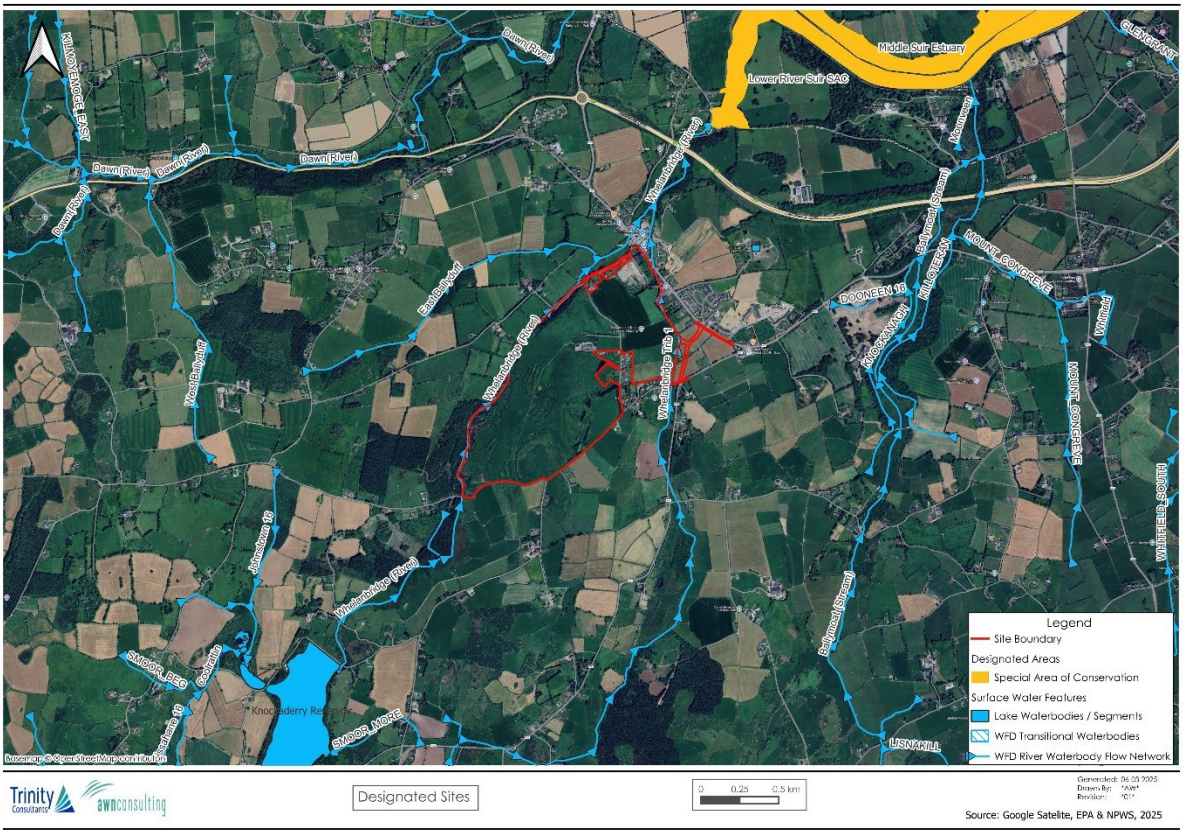
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The proposed development site also has a hydrological pathway/connection through the Suir Rivers with the River Barrow and River Nore SAC (Site Code: 002162), located c. 16.7km east (linear distance) and c. >20km downstream which eventually outfalls to Waterford Harbour coastal waterbody (European Code: IE_SE_100_0000).

The latter connection are lengthy hydrological pathways allowing significant time for settlement and dilution and as such there is no potential for change in water quality of this receiving habitat.

Refer to Figure 6-6 below for location of the Lower River Suir SAC and the hydrological connectivity in the context of the proposed development site. Further assessment is provided in Chapter 7 Biodiversity.

Figure 6-6 Designated Sites (NPWS, 2025)



6.3.8 Rating of Importance of Hydrological Attributes

Based on the review of the receiving environment undertaken (Section 6.3.1 through Section 6.3.8) and based on the TII methodology (2009) (See Appendix 6.2), the importance of the hydrological features at this site can be rated as '*Medium*' importance with medium quality or value on a local scale, due to the status of the river waterbodies in the vicinity of the site (i.e. the Whelanbridge River & Whelanbridge Trib 1) which are classified as '*Poor*' by the WFD and are '*At Risk*' of not achieving a good status (WFD Period: 2016-2021) and the hydrological pathway to the Lower River Suir SAC.

6.3.9 Hydrogeology

6.3.9.1 Aquifer Classification

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The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater transmissivity (mm^3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The GSI (2025) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones
- PI – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones
- PU – Poor Aquifer – Bedrock which is Generally Unproductive

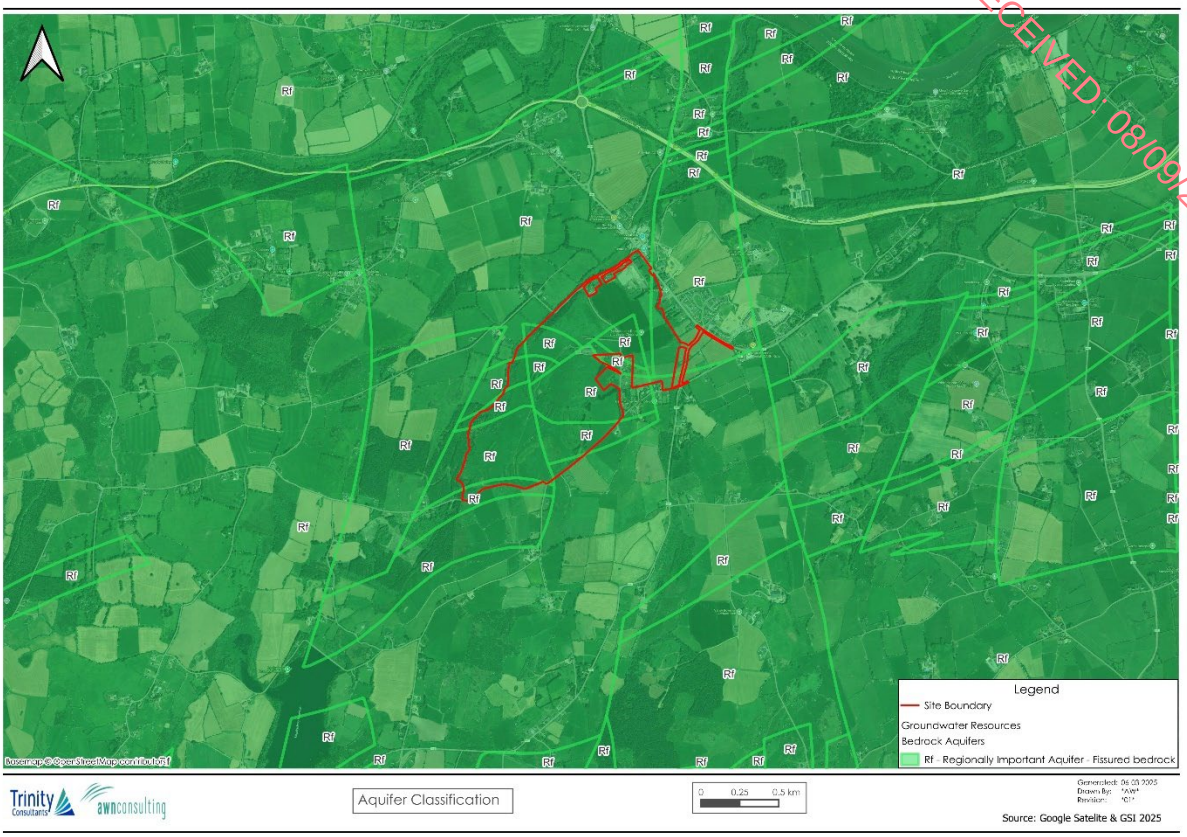
Gravel Aquifer

- Lg - Locally Important Aquifer - Sand & Gravel
- Rg - Regionally Important Aquifer - Sand & Gravel

The bedrock aquifer underlying the proposed development site, according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map, is classified as a "*Regionally Important Aquifer – Fissured Bedrock*" (Rf). This aquifer is capable of supplying regionally important supplies (e.g., large public water supplies). Groundwater movement in this category of aquifer is through joints and fractures, rather than through the rock mass. Figure 6-7 below presents the current bedrock aquifer map for the region.

Figure 6-7 Aquifer Classification Map (GSI, 2025)

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The site is underlain by the Waterford groundwater body (GWB) (European Code: IE_SE_G_149), which has been investigated by the GSI and is described as a '*Productive Fissured Bedrock*'. Based on the most recent data (www.epa.ie), the Waterford GWB for which the site is located entirely within, has a WFD status of "*Good*" (WFD Period: 2016-2021) and a WFD risk score (3rd Cycle) of "*Not at Risk*" of not achieving good status.

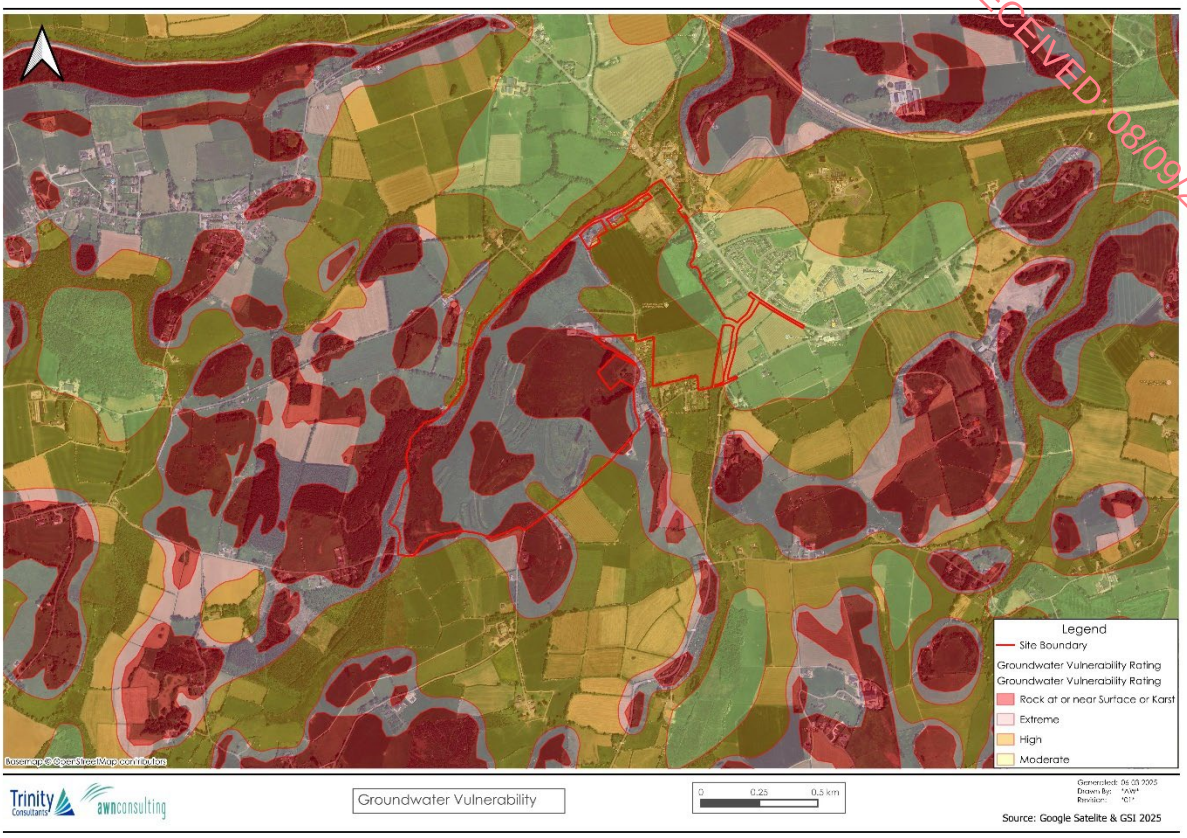
6.3.9.2 Aquifer Vulnerability

Aquifer vulnerability is already described in Chapter 5, section 5.3.6. The east of the proposed development site is classified by the GSI as having '*Moderate*' (M) i.e. where the proposed development is located; and '*High*' (H) vulnerability. The western portion of the proposed development site is classified as having '*Extreme*' (E) to '*Rock at or Near Surface or Karst*' (X) in the area of Blacknock Hill, where a higher elevation is experienced and bedrock outcrops are recorded.

Refer to Figure 6-8 below for the aquifer vulnerability in the context of the proposed development site.

Figure 6-8 Aquifer Vulnerability (GSI, 2025)

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6.3.9.3 Groundwater Wells and Flow Direction

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. The current well index shows 10 no. wells are located within the boundary of the proposed development site. The wells usages are "Industrial" for 7 no. boreholes, 1 no. borehole for "Domestic" use and 3 no. well usages are currently unknown. A further 23 no. boreholes are mapped in the wider study area within a 2km radius of the proposed development site.

Figure 6-9 below presents the GSI well search for the area surrounding the proposed development site. To note the blue circles show a 1 km radius circle around the individual well locations.

There are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the proposed development site.

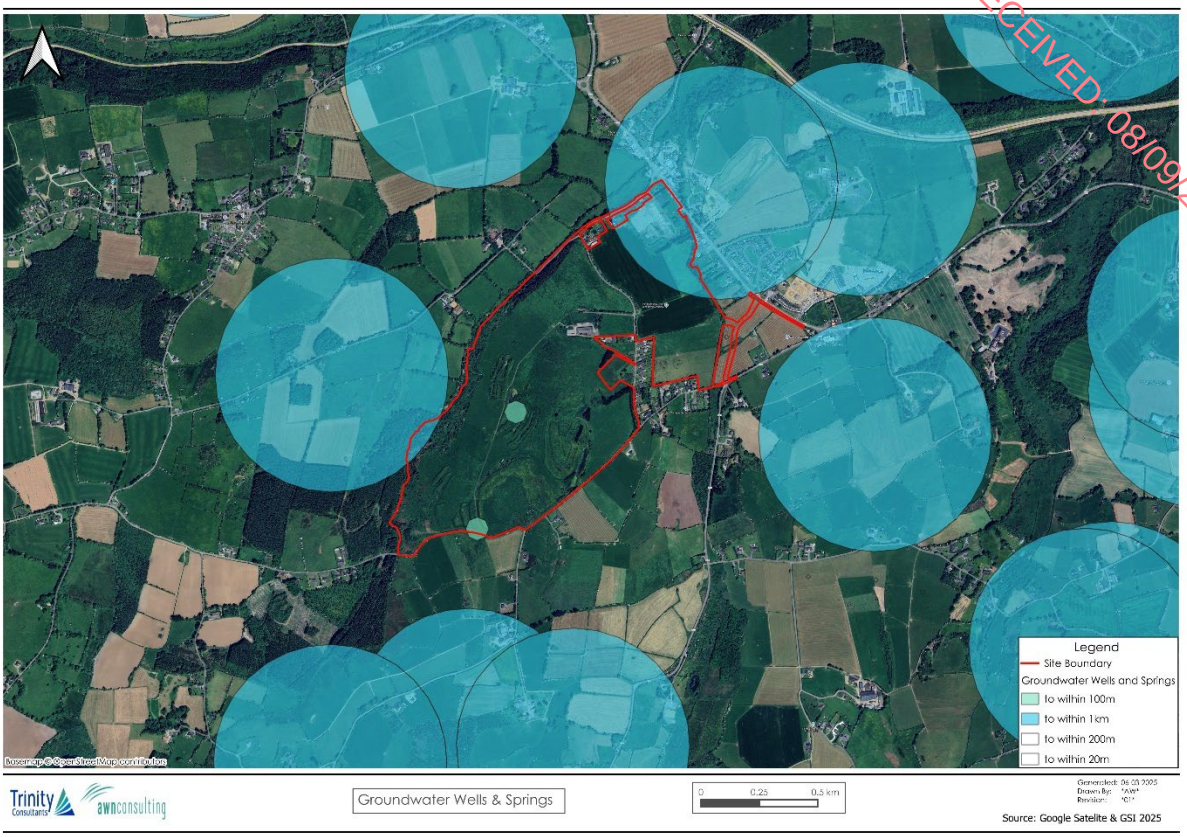
The nearest Group Scheme Preliminary Source Protection area is Ballydurn, located c. 10.7km north-west of the proposed development site. The nearest Public Supply Source Protection area is Kilmacthomas PWS Ballyogarty located c. 10.8km south-west of the proposed development site.

Neither of these areas share a hydrological or hydrogeological connection to the site and are located within separate Sub-Catchments i.e. Clodiagh[Portlaw]_SC_010 (Sub-Catchment ID: 16_17) and Mahon_SC_010 (Sub-Catchment ID: 17_3), respectively.

Figure 6-9 below presents the GSI well search for the area surrounding the proposed development site. To note the blue circles show a 1 km radius circle around the individual well locations.

Figure 6-9 Groundwater Wells & Springs (GSI, 2025)

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The well card data presented in Table 6.1 below shows the occurrence of recorded wells within a 2 km radius of the site, information regarding the depth to bedrock, and hence the depth of overburden is noted for each well where available. From the GSI well card data presented in

GSI Name	Type	Depth (m)	Depth to Bedrock	Bedrock Met	Townland
Wells located within the boundary of the proposed development site.					
2309NEW123	Borehole	27.4	2.4	Yes	Amberhill
2309NEW141	Borehole	2	2	Yes	Blackknock
2309NEW144	Borehole				Blackknock
2309NEW140	Borehole	1	1	Yes	Blackknock
2309NEW085	Unknown	10			Blackknock
2309NEW142	Borehole				Blackknock
2309NEW143	Borehole				Blackknock
2309NEW019	Borehole	18.3	3.1	Yes	Adamstown
2309NEW011	Borehole	61	3.7	Yes	Blackknock
2309NEW012	Borehole	61	4.3	Yes	Blackknock
Wells located within a 2km radius of the proposed development site.					
2309NEW004	Borehole	15.8	1.5	Yes	Raheens
2309NEW026	Borehole	18.9	5.2	Yes	Raheens
2309NEW005	Borehole	16.2	2.4	Yes	Raheens
2309NEW002	Borehole	26.8	4.9	Yes	Ballyduff East

GSI Name	Type	Depth (m)	Depth to Bedrock	Bedrock Met	Townland
2309NEW025	Borehole	14.3	3.1	Yes	Ballycraddock
2309NEW023	Borehole	16.5	2.1	Yes	Ballycraddock
2309NEW008	Borehole	18.3	8.5	Yes	Ballycraddock
2309NEW079	Borehole	18.3	2.7	Yes	Smoor
2309NEW027	Borehole	12.2	1.8	Yes	Smoor
2309NEW003	Borehole	20.4	2.4	Yes	Smoor
2309NEW028	Unknown	16.5	3.7	Yes	Smoor Beg
2309NEW018	Borehole	11	3.4	Yes	Carrickanure
2300NEW002	Borehole	26.8	4.9	Yes	Ballyduff East
2311SEW031	Borehole	39	6.1	Yes	Cullenagh
2311SEW030	Borehole	28	6.1	Yes	Newtown
2311SEW012	Borehole	28.3	7.6	Yes	Kilmeaden
2311SEW006	Borehole	11	5.8	Yes	Kilmeaden
2309NEW070	Borehole	28.3	3.1	Yes	Adamstown
2311SEW032	Borehole	42.7	9.1	Yes	Mountcongreve
2311SEW033	Borehole	27.4	4.9	Yes	Mountcongreve
2309NEW016	Borehole	54.9	3.1	Yes	Powersknock
2309NEW039	Borehole	32.9	7.6	Yes	Whitfield
2309NEW048	Borehole	21.3	3.1	Yes	Whitfield North

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Table 6.2, it can be seen that the yield class ranges from predominately '*Poor*' in the east of the site to '*Moderate*' and '*Excellent*' in the west of the site. The depth to bedrock across the site ranges from 1m BGL in the west of the site to 4.3m BGL in the east. The site and surrounding area is serviced by public supply.

Table 6.1 GSI Well Card Data for the Site location and Surrounding Area (GSI, 2025)

GSI Name	Type	Depth (m)	Depth to Bedrock	Bedrock Met	Townland
Wells located within the boundary of the proposed development site.					
2309NEW123	Borehole	27.4	2.4	Yes	Amberhill
2309NEW141	Borehole	2	2	Yes	Blackknock
2309NEW144	Borehole				Blackknock
2309NEW140	Borehole	1	1	Yes	Blackknock
2309NEW085	Unknown	10			Blackknock
2309NEW142	Borehole				Blackknock
2309NEW143	Borehole				Blackknock
2309NEW019	Borehole	18.3	3.1	Yes	Adamstown
2309NEW011	Borehole	61	3.7	Yes	Blackknock
2309NEW012	Borehole	61	4.3	Yes	Blackknock
Wells located within a 2km radius of the proposed development site.					

GSI Name	Type	Depth (m)	Depth to Bedrock	Bedrock Met	Townland
2309NEW004	Borehole	15.8	1.5	Yes	Raheens
2309NEW026	Borehole	18.9	5.2	Yes	Raheens
2309NEW005	Borehole	16.2	2.4	Yes	Raheens
2309NEW002	Borehole	26.8	4.9	Yes	Ballyduff East
2309NEW025	Borehole	14.3	3.1	Yes	Ballycraddock
2309NEW023	Borehole	16.5	2.1	Yes	Ballycraddock
2309NEW008	Borehole	18.3	8.5	Yes	Ballycraddock
2309NEW079	Borehole	18.3	2.7	Yes	Smoor
2309NEW027	Borehole	12.2	1.8	Yes	Smoor
2309NEW003	Borehole	20.4	2.4	Yes	Smoor
2309NEW028	Unknown	16.5	3.7	Yes	Smoor Beg
2309NEW018	Borehole	11	3.4	Yes	Carrickanure
2300NEW002	Borehole	26.8	4.9	Yes	Ballyduff East
2311SEW031	Borehole	39	6.1	Yes	Cullenagh
2311SEW030	Borehole	28	6.1	Yes	Newtown
2311SEW012	Borehole	28.3	7.6	Yes	Kilmeaden
2311SEW006	Borehole	11	5.8	Yes	Kilmeaden
2309NEW070	Borehole	28.3	3.1	Yes	Adamstown
2311SEW032	Borehole	42.7	9.1	Yes	Mountcongreve
2311SEW033	Borehole	27.4	4.9	Yes	Mountcongreve
2309NEW016	Borehole	54.9	3.1	Yes	Powersknock
2309NEW039	Borehole	32.9	7.6	Yes	Whitfield
2309NEW048	Borehole	21.3	3.1	Yes	Whitfield North

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Table 6.2 GSI Well Card Data – Yields in the Study Area (GSI, 2025)

GSI Name	Type	Townland	Usage	Yield Class	Yield m^3/d
Wells located within the boundary of the proposed development site.					
2309NEW123	Borehole	Amberhill	Domestic	Excellent	1091
2309NEW141	Borehole	Blackknock	Industrial		
2309NEW144	Borehole	Blackknock	Industrial	Moderate	58.7
2309NEW140	Borehole	Blackknock	Industrial		
2309NEW085	Unknown	Blackknock			
2309NEW142	Borehole	Blackknock	Industrial	Moderate	55
2309NEW143	Borehole	Blackknock	Industrial	Moderate	48
2309NEW019	Borehole	Adamstown		Poor	32.7
2309NEW011	Borehole	Blackknock	Industrial	Poor	21.8
2309NEW012	Borehole	Blackknock		Good	327
Wells located within a 2km radius of the proposed development site.					

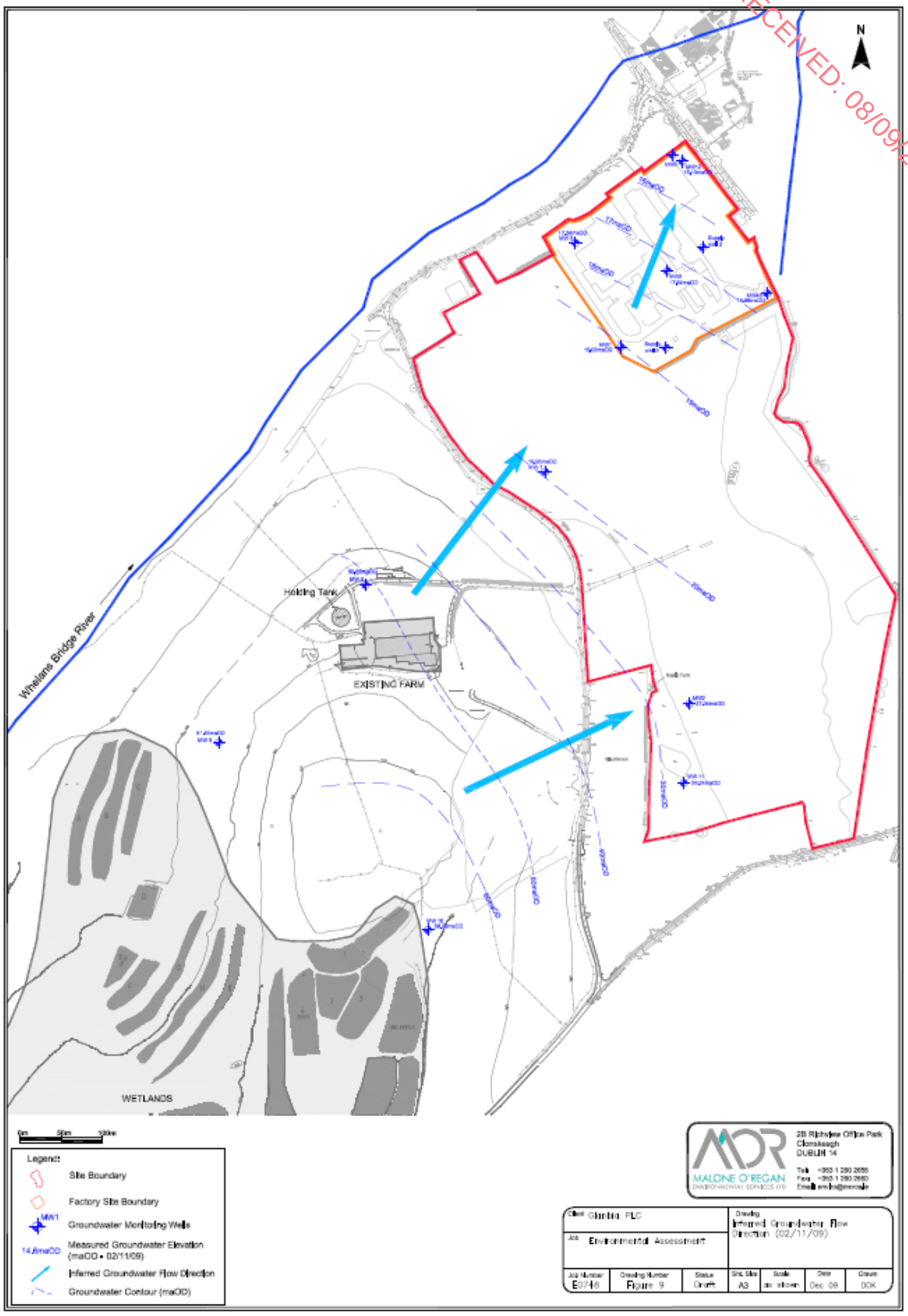
GSI Name	Type	Townland	Usage	Yield Class	Yield m^3/d
2309NEW004	Borehole	Raheens	Domestic	Poor	21.8
2309NEW026	Borehole	Raheens		Poor	28
2309NEW005	Borehole	Raheens	Domestic	Poor	21.8
2309NEW002	Borehole	Ballyduff East	Domestic	Poor	21.8
2309NEW025	Borehole	Ballycraddock		Poor	27.3
2309NEW023	Borehole	Ballycraddock		Moderate	76.3
2309NEW008	Borehole	Ballycraddock	Domestic	Poor	21.8
2309NEW079	Borehole	Smoor		Poor	32.7
2309NEW027	Borehole	Smoor		Poor	27.3
2309NEW003	Borehole	Smoor	Domestic	Poor	26.2
2309NEW028	Unknown	Smoor Beg		Poor	32.7
2309NEW018	Borehole	Carrickanure		Good	131
2300NEW002	Borehole	Ballyduff East			
2311SEW031	Borehole	Cullenagh		Moderate	54.5
2311SEW030	Borehole	Newtown	Domestic	Poor	32.7
2311SEW012	Borehole	Kilmeaden	Domestic	Moderate	43.6
2311SEW006	Borehole	Kilmeaden	Domestic	Good	131
2309NEW070	Borehole	Adamstown		Moderate	76.3
2311SEW032	Borehole	Mountcongreve		Moderate	54.5
2311SEW033	Borehole	Mountcongreve		Moderate	43.6
2309NEW016	Borehole	Powersknock		Poor	32.7
2309NEW039	Borehole	Whitfield		Poor	21.8
2309NEW048	Borehole	Whitfield North		Poor	27.3

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The approximate topographical levels for the proposed site range between 89.0AoD to 15.0mAOD. The Blackknock Hill located in the western area has the highest point of 89.0mAoD in the centre and the lowest point 15mAoD to the north where the main entrance to the old Cheese Factory is located. The site slopes to the north-east towards the Whelanbridge Trib 1 (European Code: IE_SE_16W010400) and south-west towards the Whelanbridge River (European Code: IE_SE_16W010400).

The groundwater flow direction likely follows the local topography towards the Whelanbridge Trib 1 and Whelanbridge River contributing to their baseflow. The 2009 due diligence report noted that groundwater in the bedrock is locally confined in the eastern portion of the former cheese plant site at MW4; where artesian conditions were observed with a local upward hydraulic gradient as shown in Figure 6-10. A spring line is also inferred along this portion of the site. The estimated hydraulic gradient across the cheese plant site ranges from 0.006 to 0.017. Westwards the hydraulic gradient is steeper and controlled by topography.

Figure 6-10 Location of Monitoring wells (MOR, 2009)



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6.3.9.4 Groundwater Quality

6.3.9.4.1 Regional Groundwater Quality

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The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the Directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

Presently, the groundwater body in the region of the site (Waterford GWB - European Code: IE_SE_G_149) for which the site is located entirely within, has a WFD status of "*Good*" (WFD Period: 2016-2021) and a WFD risk score (3rd Cycle) of "*Not at Risk*" of not achieving good status, meaning it has achieved its objectives end the overall status is considered good. The most recent Sub-Catchment Assessment (September, 2022) carried out by the EPA on the PIL_SC_010 Sub-Catchment (Sub-Catchment ID: 16_27) states that the main pressure on the Upper Suir Estuary Transitional Waterbody is from agriculture. This *"Good"* status is related to the overall groundwater status i.e. quantitative groundwater status and chemical groundwater status.

6.3.9.5 Local Groundwater Quality

As part of the site investigations carried out Malone O' Regan (MOR) between July and November 2009, groundwater samples were analysed for a broad range of potential contaminants based on the surrounding land use, site history and current operations at the time. The analytical suite included the following parameters:

- Metals including arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel and zinc;
- Indicators including chloride, sulphate and fluoride;
- Nutrients including nitrate and nitrite, ammoniacal nitrogen, phosphorous and potassium; and
- Total petroleum hydrocarbons (TPH) as TPH Criteria Working group (CWG) and mineral oil;
- Volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene and total xylenes (BTEX) and semi-volatile organic compounds (SVOCs) including phenols and phthalates;
- Polycyclic aromatic hydrocarbons (PAHs);
- Faecal and total coliforms; and
- Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).

Groundwater results were assessed relative to available Irish guideline and legislative standards at that time as follows:

- Irish Drinking Water Standards (SI No. 278 of 2007).
- Environmental Protection Agency (EPA) interim groundwater guideline values (IGVs) (EPA, 2003).

Where relevant these results have been compared with current groundwater regulations.

A summary of the groundwater analytical results are presented below.

6.3.9.5.1 Indicators and Inorganics

Reported concentrations of field measured indicator parameters including pH, temperature and electrical conductivity and laboratory measured fluoride and sulphate were within the relevant guidelines.

Chloride concentrations were reported in excess of the IGV (30mg/l) at MW2 (30.6mg/l), at MW5 (71.8mg/l - 99.5mg/l), MW7 (30.9mg/l), MW8 (90.0mg/l) and MW10 (38.8mg/l). All reported chloride levels were below the drinking water standard (250mg/l).

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6.3.9.5.2 Nutrients

Nitrate concentrations were below the Groundwater Regulations (S.I. No. 9 of 2010 and 2016) (37.5mg/l as NO_3) at all monitoring and this concentration is below the drinking water standard (50mg/l as NO_3). Nitrite concentrations were below the Ground water Regulations (S.I. No. 9 of 2010 and 2016) (0.375mg/I as NO_2) were reported all monitoring locations and these concentrations were all below the drinking water standard (0.5mg/l as NO_2).

In addition elevated total ammonia in excess of the Ground water Regulations (S.I. No. 9 of 2010 and 2016) (0.175mg/l as NH_4) was reported for MW1 (0.39mg/l as NH_4), MW2 (3.9mg/l as NH_4), MW3 (1.1mg/I as NH_4), MW5 (1.6mg/l to 2.44mg/l as NH_4), MW9 (0.5mg/l as NH_4) and MW10 (2.06mg/l as NH4). However, all these concentrations were below the drinking water standard (0.5mg/l as NH4). Elevated nitrite (0.53mg/l as NO_2) and ammonia (1mg/I as NH_4) were reported for the perched groundwater sample collected at the southeast of the brownfield portion of the site (PH5/MW4s).

Elevated concentrations of ortho-phosphate in excess of the relevant IGV (0.03mg/l as PO_4) were reported at MW2 (0.09mg/l as PO_4), MW3 (0.07mg/1 as PO_4) and MW12 (0.13mg/l as PO_4). Reported potassium levels are below the IGV (5mg/l) for all groundwater samples collected.

In addition, elevated total ammonia in excess of the Groundwater Regulations (S.I. No. 9 of 2010 and 2016) (0.175mg/l as NH_4) and drinking water standard (0.5mg/l as NH_4) was reported for samples collected at off-site upgradient locations at MW9 (0.5mg/l as NH_4) and MW10 (2.06mg/l as NH_4).

It is considered that the slightly elevated nutrient concentrations in groundwater beneath the site may be due to a number of contributory sources including the surrounding land use (agricultural), local septic tanks and historical operations at the site (irrigation of process effluent).

6.3.9.5.3 Metals

The 2009 due diligence report did not provide actual metal concentrations but noted the following findings. Elevated concentrations in excess of the relevant IGVs and drinking water standards for arsenic (1Oµg/I), lead (10µg/I and 25µg/l, respectively), nickel (20µg/l) and zinc (100µg/I) were reported for samples collected from MW1, MW2 (except arsenic), MW3, PH5/MW4s (except arsenic), MW5, MW6, MW7 and MW11. Concentrations were also reported in excess of the IGV and/or drinking water standards for arsenic at MW12; and lead at MW8. Reported elevated concentrations of arsenic (MW1), nickel (MW1) and zinc (MW1 and MW5) during the monitoring round carried out on the 5th August 2009 were not recorded during the monitoring round carried out on the 12th and 13th of October 2009.

Copper concentrations were reported in excess of the IGV (30µg/l) at MW1, PH5/MW4s, MW5, MW6, MW? and MW11; although below the drinking water standard (2000µg/l). Chromium was detected in excess of the IGV and/or drinking water standards (30µg/l and 50µg/l respectively) at PH5/MW4s and MW5. Barium was detected in excess of the IGV (1O0µg/I) at MW2, PH5/MW4s, MW5, MW7, MW8 and MW11. Reported elevated concentrations of barium (MW5), chromium W5) and copper (MW1 and MW5) during the monitoring round carried out on the 5th of August 2009 were not recorded on the 12th and 13th of October 2009.

Elevated concentrations of metals were reported at the ICW and farm for lead and barium at MW8.

The reported concentrations of metals are considered to be most likely associated with the geology of the aquifer material.

6.3.9.5.4 Hydrocarbons. Phenols. VOCs and SVOCs

Petroleum hydrocarbons, PAHs, phenols, VOCs and SVOCs were reported at levels below the relevant method detection limits (MDL's) set by the laboratory for all groundwater samples collected from the site.

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6.3.9.5.5 Pesticides

Selected samples (MW1 and MW5) were analysed for organo-phosphorous and organo-chlorine pesticides, the reported results for all compounds were below relevant method detection limits (MDL's) set by the laboratory.

6.3.9.5.6 Microbiological Parameters

Total and faecal coliforms were reported at levels below the relevant method detection limits (MDL's) set by the laboratory (1cfu/100ml) for analysed samples (MW2 and MW4d). While these reported results suggest an absence of microbiological parameters in groundwater beneath the site, the MDL is above the drinking water standard of 0cfu/100ml.

6.3.10 Rating of Site Importance of the Hydrogeological Features

The review of the receiving environment undertaken (Section 6.3.9) and based on the TII methodology (2009) (Appendix 6.1) the importance of the hydrogeological features at this site can be rated as '*High*' importance with high significance or value on a local scale, due to the aquifer beneath the site being classified as a "*Regionally Important Aquifer – Fissured Bedrock*" (Rf), capable of supplying regionally important supplies (e.g., large public water supplies) and contributes to the baseflow of local rivers (i.e. the Whelanbridge River, Whelanbridge Trib 1 and the Lower River Suir SAC).

6.3.10.1 Conceptual Site Model

AWN have developed a conceptual site model (CSM) in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development.

- The bedrock aquifer is classified as a "*Regionally Important Aquifer – Fissured Bedrock*" (Rf). Groundwater movement in this category of aquifer is through interconnected joints and fractures, rather than through the rock mass, resulting in longer flow paths.
- The GSI presently classifies the aquifer underlying the proposed development site with several vulnerability classifications. Most of the west of the proposed development site has a '*Moderate*' (M) to '*High*' (H) vulnerability. The vulnerability is classified as having '*Extreme*' (E) to '*Rock at or Near Surface or Karst*' (X) in the Blackknock Hill area of the site, where bedrock outcrops are recorded.
- There is no evidence of residual groundwater or surface water contamination as a result of previous use of the site by the cheese plant. There is evidence of some impact on groundwater quality from use of the and for agriculture over time.
- A review of the available soil quality data is provided in Chapter 5 section 5.3.10.3. As noted there, there is no evidence of extensive soil contamination as a result of previous use. However, any residual soil contamination encountered during construction will be removed of to a licenced site minimising any potential for mobilisation in the water environment.
- The proposed development is outside the zone of contribution for any public or group groundwater supplies.
- The proposed development site has a hydrological connection/pathway with the Lower River Suir SAC (Site Code: 002137), c. 1.2km downstream in the Upper Suir Estuary transitional waterbody, through the Whelanbridge Trib 1 and Whelanbridge River which receive direct run-off and baseflow contributions from.
- The proposed development site also has a hydrological pathway/connection through the Suir Rivers with the River Barrow and River Nore SAC (Site Code: 002162), located c. 16.7km east (linear distance) and c. >20km downstream which eventually outfalls to Waterford Harbour coastal waterbody

(European Code: IE_SE_100_0000). The latter connection are lengthy hydrological pathways allowing significant time for settlement and dilution and as such there is no potential for change in water quality of this receiving habitat.

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6.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the proposed development. Therefore, it should be read in conjunction with the full development package.

For a more comprehensive understanding of the proposed development, please refer to Chapter 2 'Description of the Proposed Development' of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

6.4.1 Demolition Phase

Some demolition of existing structures is required within the former factory site and grubbing up of foundations, hard standing and existing asphalt (estimated at 24,100sq.m (approx.)) before construction works can begin. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development.

6.4.2 Construction Phase

The activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the hydrological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the proposed development.

6.4.2.1 Site Levelling and Excavations

Excavations and levelling of the site to the necessary foundation base levels for the proposed village centre and technology park will require the excavation and infill. The cut and fill (Table 6.3) is presented below:

Table 6.3 Cut and Fill (Atkinsrealis)

Surface	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Site Cut & Fill	214811.570	87918.951	126892.619
Ponds Volume	23048.794	1.840	23046.954
Infiltration trenches Solar Farm	6188.113	0.000	6188.113
Total	**244,048.477**	**87,920.791**	**156,127.686**

Approximately 46,838m^3 of material needing to be removed and transported off site for licenced disposal or classed as a by -product under Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended. c. 109,289 m^3 is expected to be being reused on site for landscaping and berms.

Minimal excavation works will be required for the construction of the proposed solar farm on Blackknock Hill.

The proposed development will require the construction of a bridge across the Whelanbridge Trib 1 EPA river waterbody, to facilitate the new access roads off the R680 and R681 regional roads. The proposed bridge typical details and sections are presented in the civil engineering drawings. The final bridge will be

designed in accordance with OPW and Local Authority requirements as well as being designed for the 100yr flood event with a minimum of 300mm freeboard. It is proposed to use 800mm deep beams spanning approximately 20m with 200mm precast flat top and road constructed on this. The beams will sit on cast insitu abutments which will sit on a piled foundation. The construction does not require any instream works and a method statement is included in the CEMP to ensure protection of water quality during construction works.

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Addition site investigation is planned as part of preconstruction works to confirm foundation design. If ground conditions are good, a Pad Foudation solution will be utilised to transfer heavy column loads to suitable soil strata below. If ground conditions are poor a Pile solution will be utilised to transfer heavy column loads to suitable soil strata or rock below. A soil stabilation option may be viable pending a more detailed site investigation and soil appraisal.

Depending on the time of year development works are carried out, local minor dewatering may be required during excavation works and groundworks at the proposed development site i.e. at the location of the new village centre and three (3) no. ICT buildings. During the site investigations carried out by Malone O'Regan (MOR) in 2009, perched groundwater was encountered as minor seepages/saturated soil at depths ranging from 0.2m BGL (beneath the proposed ICT buildings) to 4.9m BGL (c. 200m west of the proposed energy centre). The perched water was generally associated with granular material or top of weathered bedrock. Bedrock was encountered at the site 9.0m BGL in the north-east of the site where the proposed village centre is located, therefore, groundwater is not anticipated to be encountered during excavation works at this location.

6.4.2.2 Storage of soils/aggregates

The employment of good construction management practices and full adherence to the Construction & Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. Such practices include the proper storage of soil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site.

Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

6.4.2.3 Storage of hazardous material

Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

6.4.2.4 Import/Export of Materials

There will be a requirement for deliveries and refuelling of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Refuelling will be completed in accordance with the best standard practice refuelling procedure. To support the construction of proposed roads, car parks, and buildings, additional fill material may need to be imported.

A 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

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Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil removed will be re-used on site for backfill, landscaping and berms. Any surplus topsoil, subsoil and bedrock material will be transported off site and disposed of at a fully authorised soil recovery site or licenced landfill based on the waste soil classification.

6.4.3 Operational Phase

The proposed development characteristics which relate to the hydrological and hydrogeological environment during operation are summarised below.

There is no required bulk diesel store on site rather back up generators will be fuelled by hydrotreated vegetable oil (HVO) which is biodegradable if a spill/leak occurred to ground. The required HVO to operate the datacentre back up generators will be supplied by belly tanks (c. capacity 25m^3 x 20 gensets per building). Total HVO storage will be a maximum of 4500m^3. The Energy Centre will be supplied from 6 no. 500 m^3 tanks.

In addition, storm drainage from the generator yards is drained through an oil interceptors to treat any accidental hydrocarbon vehicle leaks and HVO leaks. interceptors are also located above and below the attenuation pond i.e. prior to stormwater discharging from the site.

There is no requirement for abstraction of groundwater during operational phase. As stated below the proposed SuDS design will involve discharge to ground beneath the north car park of the village centre to allow for surface water storage, as well as infiltration to the surrounding soil prior to discharging to the downstream network.

The proposed drainage network and surface runoff will comply with Waterford County Council and SUDs requirements. All surface water generated from the proposed development is to be attenuated on site and discharged to the Whelanbridge Trib 1 located along the sites eastern boundary at greenfield run-off rate. It is envisaged that there will be 2 no. discharge locations for the village centre and 1 no. discharge location for the technology park.

Storm flows will be attenuated to the QBar greenfield runoff value for the area being developed. It is proposed to use various SuDS management tools onsite including the following:

- **Porous Asphalt**: Porous asphalt has been proposed in the car parks. The significant storage capacity of porous asphalt pavement systems provides a cost-effective drainage solution for capturing and controlling the release of surface water. Porous Asphalt is designed to have a very high content of interconnected voids allowing passage of water through its body. The surface contains voids allowing water to rapidly drain from the surface down through the pavement.
- **Filter Drain/swale drain**: It is proposed to use oversized filter drainage throughout the site as interceptor across the proposed development to collect surface water runoff from landscape features. A filter drain is a stone filled trench, with a perforated pipe at the base. Runoff flows slowly through the granular material, trapping sediments and providing attenuation. Flow is then directed through the perforated pipe to the discharge point. The type of filter drain trench proposed on the site will be lined with an impermeable geotextile membrane to prevent any infiltration to ground through the trench. It is proposed to use a swale drain along the edge of the internal road network where practicable. This drainage shall discharge to the surface water discharge network. Swales reduce the runoff flows through the system and providing a level of treatment by trapping sediments prior to entering the surface water network.

- **Permeable Paving (Grasscrete)**: The Grassgrete paving will be constructed on suitable areas outside the buildings. Grasscrete is a 'source control' method. It will allow infiltration at source within the voids in the stone. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water and is a recognised part of the suite of SUDS.
- **Attenuation ponds**: Attenuation ponds are proposed prior to the outfall locations, and they allow for water storage and flow control, preventing excessive loading on the downstream surface water network. The attenuation ponds are proposed to be lined with an impermeable geotextile membrane to prevent any infiltration to ground.
- **Infiltration tank**: An infiltration tank is proposed under the north car park of the village centre to allow for surface water storage, as well as infiltration to the surrounding soil prior to discharging to the downstream network.
- **Rainwater harvesting**: Rainwater harvesting is the collection of rainwater runoff from roofs and other impermeable areas, and using it as a supply of water for the building's purposes.

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The proposed surface water design was designed to provide the following, including a 20% climate change;

- No surcharging in the 1 in 5-year storm event. Pipes immediately upstream of flow control devices may encounter small amount of surcharging due to the flow being throttled accordingly.
- No Flooding in the 1 in 30-year storm event.
- No flooding against a 1 in 100-year storm event or controlled flooding allowing the volume to be contained on site and not impact the surrounding infrastructure.
- The total maximum attenuated volume of water stored in all the attenuation ponds for the 100-year event was calculated to be 7905.1m^3 for the Technology Park and 2025.5m^3 for the Village Centre.

The system shall also incorporate an overflow on the most downstream hydro-brake manhole. The overflow shall consist of a high-level overflow pipe provided to allow water escape should the hydro-brake block or malfunction, or to cater for high water levels created by a storm greater than the design storm (100-year).

It is proposed to provide separate foul networks for the Technology Park and the Village Centre, to enable monitoring of the wastewater discharge from the Data Centres and Energy Centres separately from the domestic wastewater discharge from the Village Centre. For the Technology Park, it is proposed to provide a 225mm foul water pipe network along the perimeter of the Energy Centre and the Data Centres and tie in with the existing foul network running to the north of the site. A new manhole is proposed for this connection and the existing foul sewer line is proposed to be upsized to 225mm and reconstructed up to the main road. For the Village Centre, it is proposed to provide a 225mm foul water pipe network along the internal road network of the Village Centre and connect to the existing foul manhole to the east of the site.

All foul water generated on the proposed development will be sent to Ballyduff Lower-Kilmeaden Waste Water Treatment Plant (WWTP) (Reg: A0370), located c. 620m north-east of the site along the Lacka Road. As noted on the Uisce Éireann wastewater capacity register, this plant is noted as having current capacity. A Pre-Connection enquiry application was submitted to Uisce Éireann in December 2024 for the wastewater discharge of the proposed development (Ref: DIV24393). At this stage the Confirmation of Feasibility is pending.

The ground under the solar panels shall be maintained as grassland (wild flower meadow) which will serve to reduce the risk of erosion and limit rate of surface water run-off across the site. The operation and maintenance of the solar farm shall include monitoring and maintenance of the grassland beneath the panels. Where compaction of soil is observed, the ground will be cultivated and re-seeded.

The solar farm has been designed with a network of filter drains incorporating perforated pipes to manage surfacewater runoff generated across the site. These drains intercept and slow down the flow of water,

preventing the formation of heavy sheet flow caused by the solar panels. Each filter drain consists of a perforated pipe, typically 100–150 mm in diameter, surrounded by a layer of stone. The undersized pipe restricts flow, causing water to surcharge into the stone surround, which temporarily stores the runoff. This design allows the filter drains to function simultaneously as reservoirs, infiltration systems, and flow control devices. The drainage network ultimately discharges to the river located north of the solar farm. At intervals, sections of the system are constructed with pipe only, without the surrounding stone. These breaks create intentional bottlenecks, forcing water stored in the stone layer to pass solely through the pipe. This further reduces flow rates and enhances the system's ability to control discharge volumes.

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Refer to the Engineering Report, prepared by AtkinsRéalis Ireland Limited in December 2024 submitted as part of the planning application for further information on the proposed storm water and foul water management and design.

6.5 Potential Impacts of the Proposed Development

An analysis of the potential impacts of the proposed development on the hydrological and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between land, soils and geology with hydrogeology and hydrology the following impacts discussed will be considered applicable to both Chapter 5 and 6 of the EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 6.6 of this EIA.

6.5.1 Demolition Phase

The development contains existing buildings to be demolished. The likelihood of significant effects on the hydrology and hydrogeology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of extensive subsurface excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the receiving water environment is minimal and no significant effects are anticipated.

Overall, the surface-level demolition works will have a negligible impact on the hydrology and hydrogeology preserving their integrity and minimising any potential environmental consequences. In the absence of mitigation, the effect on hydrology and hydrogeology is likely to be ***short-term, imperceptible*** and ***negative.***

Refer to Chapter 15 – Waste Management of this EIAR for further information on predicted on and off-site reuse, recycle and disposal rates for demolition waste.

6.5.2 Construction Phase

6.5.2.1 Potential Impacts on Surface Water and Groundwater Quality

There is potential for run-off water to become contaminated with pollutants released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the Whelanbridge River and Whelanbridge Trib 1 which ultimately discharge to the Lower River Suir SAC (Site Code: 002137) c. 1.2km downstream, and the underlying "*Regionally Important Aquifer – Fissured Bedrock*" i.e. the Waterford GWB (European Code: IE_SE_G_149).

During construction of the development, the potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;

- Excavations/ top and sub soil stripping- Increase sediment run off (erosion during rainfall periods), Pollutant mobilisation (heavy metal runoff), Loss of vegetation;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will be contained in a tank and taken by tanker off site for disposal at a licensed waste management facility.

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The proposed development will require the construction of a bridge across the Whelanbridge Trib 1 EPA river waterbody, to facilitate the new access roads off the R680 and R681 regional roads. If the installation is not executed correctly, there is a potential risk of compromising the integrity and stability of the river banks during the bridge installation process. This could lead to erosion or destabilisation of the surrounding areas and potentially impact the aquatic habitat. However, as outlined in Section 6.6.1.1 below, the construction works and the proposed mitigation measures will be informed by best practice guidance on the prevention of pollution during development projects. A method statement will be provided for approval by OPW and WCC prior to commencement of works. No in stream works are required.

Minimal subsurface excavation works are required for construction of the proposed solar farm on Blackknock Hill. Exclusion of construction in buffer zones around open water will be required for and as such will minimise any potential sediment run off to the two open ponds and existing drainage ditches.

There is no potential impacts from wastewater on the hydrological and hydrogeological environment as this will be collected and discharged of appropriately.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality and groundwater quality are ***negative***, ***slight*** and ***short term***.

6.5.2.2 Potential Impacts on Surface Water and Groundwater Flow and Quantity

The gradual introduction of impermeable surfaces and the compaction of soils across the construction site as a result of the land clearing and earthworks will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off along with sediment loading, which could potentially impact local drainage if not adequately mitigated. This increase in the rate and volume of direct surface run-off can result in increased sediment loading, scouring impacts on local drainage and watercourses, and downstream impacts. Prior to the installation of attenuation ponds there may be a resultant minor increase in flow to offsite drainage.

There are no significant surface water or groundwater abstractions proposed during construction, therefore no potential impacts on the existing surface water and groundwater regime.

There are no proposed permanent diversions of any drainage ditches or waterbodies as part of the proposed development.

The proposed bridge crossing on the Whelanbridge Trib 1 EPA river waterbody, to facilitate the new access roads off the R680 and R681 regional roads will be constructed without any instream works and constructed in compliance with the relevant guidance and legislation and the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

In the absence of mitigation measures the potential impacts during the construction phase on surface water and groundwater quantity and flow are ***negative***, ***not significant*** and ***short term***.

6.5.2.3 Potential Impacts on Human Health and Populations

As there are no recorded recreational waters, bathing waterbodies, no downgradient surface water abstraction points or Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas, there is no potential for impacts on human health and populations.

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6.5.2.4 Potential Impacts on Water Framework Directive Status

There is a potential of accidental discharges during the construction phase (as set out in Section 6.5.1.1). However, these are temporary short-lived events that will not impact on the status of the Whelanbridge River, Whelanbridge Trib 1, The Lower River Suir SAC (Site Code: 002137) or the underlying Waterford groundwater body (GWB) in the long-term. As such the proposed development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

Therefore, there is no potential for impacts on water framework directive status based on the current understanding of the proposed development during construction.

6.5.3 Operational Phase

6.5.3.1 Potential Impacts on Surface Water and Groundwater Quality

As stated in Section 6.4.2 above, there is a hydrological connection, via the proposed surface water management design and the Whelanbridge Trib 1 located along the sites' eastern boundary during the operational phase, as there will be 2 no. discharge locations for the village centre and 1 no. discharge location for the technology park. With the SUDs measures which include attenuation and interceptors in place there is no potential for change in surface water runoff water quality or recharge to groundwater quality.

As hydrotreated vegetable oil (HVO) is proposed to be used rather than bulk diesel for back up generators, there is minimal impact for contamination of surface water or groundwater bodies in the event of a spill/leak. HVO is considered less harmful than traditional fossil oils when it spills on the ground due to its renewable nature and biodegradability. When HVO spills, it tends to degrade rapidly through natural processes involving microorganisms, which can metabolize it into less harmful substances. This quick degradation helps minimize its impact on the hydrological environment, reducing the risk of contamination in water sources and soil. Additionally, HVO has a lower toxicity profile compared to fossil oils, making it less harmful to aquatic life and groundwater systems.

Storm drainage from the generator yards is drained through an oil interceptor to treat any accidental leaks. In addition, interceptors are located above and below the attenuation pond i.e. prior to stormwater discharging from the site.

Refer to the Engineering Report, prepared by AtkinsRéalis Ireland Limited in December 2024 for further information on the proposed storm water management and design.

In the absence of mitigation measures the potential impacts during the operational phase on surface water and groundwater quality are ***neutral***, ***imperceptible,*** and ***long-term***.

6.5.3.2 Potential Impacts on Surface Water and Groundwater Flow and Quantity

The proposed incorporation of hardstand area and the use of SUDs design measures will have a minor effect on local recharge to ground. However, the impact on the overall groundwater regime will be insignificant considering the proportion of the site area in relation to the total aquifer area.

An increase in surface water run off can have an adverse effect on the hydrological regime of downstream environments via flooding and inundation to downstream properties. and has the potential to result in increased run-off from the site if not adequately mitigated. The design has incorporated adequate attenuation in the project design to ensure no potential for off site flooding as a result of the development.

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As described in Section 6.3.7 above, the majority proposed development site is located within Flood Zone C and a small portion of the development (earthwork embankments) is constructed in flood zones A & B. However, it would be safest to keep all construction out of the areas identified as having localised flooding, completely mitigating any flood risk. The design of the proposed development and drainage infrastructure proposed will ensure that the run-off rate is restricted to greenfield run-off. The development includes the implementation of SUDS and an attenuation system. The design includes for a 20% climate change allowance. The proposed surface water design was designed to provide no surcharging in the 1 in 5-year storm event, no flooding in the 1 in 30-year storm event and no flooding against a 1 in 100-year storm event or controlled flooding allowing the volume to be contained on site and not impact the surrounding infrastructure.

There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the existing surface water or groundwater regime. As stated below the proposed SuDS design will involve infiltration to ground beneath the north car park of the village centre to allow for surface water storage, as well as infiltration to the surrounding soil prior to discharging to the downstream network. However, all proposed discharges will be adequately treated through a combination of SuDs measures prior to discharge to waterbodies.

In the absence of mitigation measures the potential impacts during the operational phase on surface water and groundwater flow and quantity are ***neutral, imperceptible,*** and ***long-term***.

6.5.3.3 Foul Water Discharge

There is an '*indirect*' hydrological connection to Lower River Suir SAC (Site Code: 002137), located c. 1.2km downstream, through the proposed foul water arising at the site.

As stated in Section 6.4.2 above, all foul water generated on the proposed development will be sent to the existing to Ballyduff Lower-Kilmeaden Waste Water Treatment Plant (WWTP) (Reg: A0370), located c. 620m north-east of the site along the Lacka Road.

According to Uiscé Éireann's (Irish Water) Wastewater Treatment Capacity Register (June 2023), there is capacity available at Ballyduff Lower-Kilmeaden WWTP. Therefore, no potential impacts are anticipated on the Whelanbridge River, the Lower River Suir SAC or the Waterford GWB. The potential impacts on Natura 2000 sites located downstream of the proposed development site are further explained in Chapter 7 (Biodiversity).

On the basis of the design and characteristics of the proposed development, and feasibility of the connection with Irish Water to Ballyduff Lower-Kilmeaden WWTP, in the absence of mitigation measures (or design measures) the potential impacts during the operational phase on Ballyduff Lower-Kilmeaden WWTP, Whelanbridge River, the Lower River Suir SAC and the Waterford GWB from the proposed foul water drainage are ***neutral, imperceptible, long-term*** in respect of wastewater loading.

6.5.3.4 Potential Impacts on Human Health and Populations

There is no potential for unmitigated off-site flooding as a result of the increased hardstanding areas due to the proposed design and drainage infrastructure proposed.

There are no recorded recreational waters, bathing waterbodies, surface water abstraction points (refer to Section 6.3.5) located downstream of the proposed development site.

In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the proposed development site (refer to Section 6.3.10.3 above).

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Therefore, there is no potential for impacts on human health and populations.

6.5.3.5 Potential Impacts on Water Framework Directive Status

There are limited discharges of surface water during the operational phase to the Whelanbridge Trib 1 located along the sites eastern boundary (refer to Section 6.4.2 above). However these discharges will be adequately attenuated via SuDS measures i.e. porous asphalt on the proposed car parks, filter drains/swale drains along the drainage route in open spaces, permeable paving (Grasscrete) outside the proposed building, attenuation ponds, infiltration tank and rainwater harvesting. Any surface water flows from the proposed development will be directed to the attenuation ponds and infiltration tank efficiently and to the maximum potential. The flow control devices will be installed downstream of the ponds outlet pipes to ensure the surface water runoff is stored maximising storage potential, prior to entering the network downstream i.e. the Whelanbridge Trib 1 located along the sites eastern boundary. These proposed design measures ensure there is no long-term negative impact to the WFD water quality status of the Whelanbridge Trib 1, Whelanbridge River, the Lower River Suir SAC (Site Code: 002137) or the underlying Waterford groundwater body (GWB).

In the scenario of an accidental release of HVO or unmitigated leak of fuel from car park areas and roads (mentioned above in Section 6.5.2), these are temporary short-lived events that will not impact on the status of the Whelanbridge River, Whelanbridge Trib 1, The Lower River Suir SAC (Site Code: 002137) or the underlying Waterford groundwater body (GWB) in the long-term. As such the proposed development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

According to Uiscé Éireann's (Irish Water) Wastewater Treatment Capacity Register (June 2023), there is capacity available at Ballyduff Lower-Kilmeaden WWTP. Therefore, the proposed peak effluent discharge calculated for the proposed development is not likely to have an impact on the capacity at WWTP or the overall water quality within the Whelanbridge River, the Lower River Suir SAC or the underlying aquifer (Waterford groundwater body) as defined within the Water Framework Directive.

Therefore, there is no potential for impacts on water framework directive status as a result of the proposed development during operation (Refer to appendix 6.3 for WFD assessment).

6.6 Mitigation Measures

6.6.1 Demolition Phase

The development contains existing buildings to be demolished. The likelihood of significant effects on the hydrology and hydrogeology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the hydrology and hydrogeology is minimal and no significant effects on the land's composition, stability, or fertility are anticipated.

Refer to Chapter 15 – Waste Management of the EIA for further information on predicted on demolition phase mitigation in terms of off-site reuse, recycle and disposal rates for demolition waste.

Overall, no mitigation measures are required during the demolition phase in relation to hydrogeology and hydrology due to the surface level nature of the works. The surface-level demolition works will have a negligible impact on hydrogeology and hydrology, preserving their integrity and minimizing any potential environmental consequences.

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6.6.2 Construction Phase

6.6.2.1 Construction & Environmental Management Plan

A Construction & Environmental Management Plan (CEMP) has been prepared in respect of the proposed development. The CEMP outlines and explains the construction techniques and methodologies which will be implemented during construction of the proposed development.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The CEMP will set out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

6.6.2.2 Suspended solids

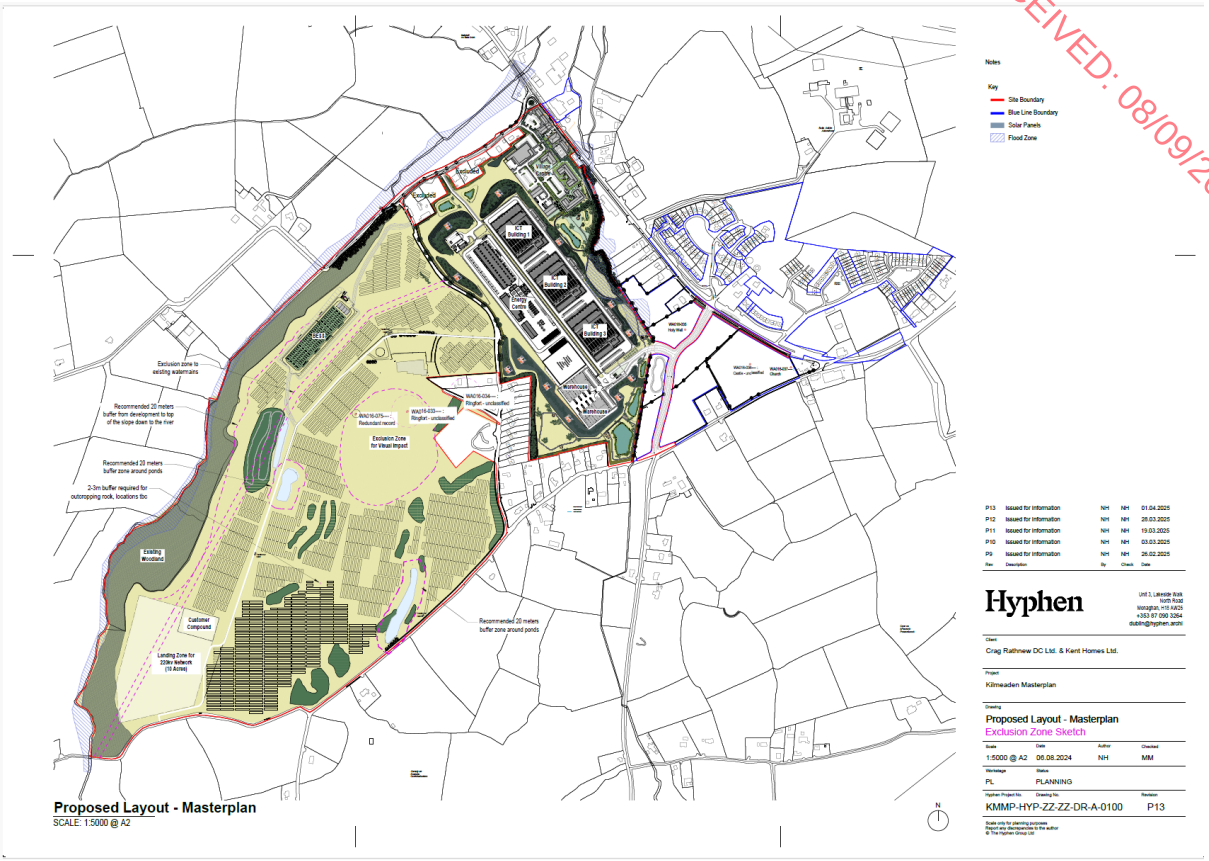
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As there is potential for run-off to indirectly discharge to a watercourse (Whelanbridge River and Whelanbridge Trib 1 and eventually to the Lower River Suir SAC), in order to manage the potential impact associated with sediment and sediment runoff the following mitigation measures will be implemented during the construction phase.

- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Silt reduction measures on site will include a combination of silt fencing and settlement measures.
- A riparian zone will be maintained along the Whelanbridge River
- It is proposed to install a french drain where required surrounding the solar farm area on Blackknock Hill and other water quality control measures i.e. silt traps, 20m buffer zones surrounding the 2 no. ponds on site will be installed during construction. Refer to Figure 6-11 below.
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate,
- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.
- Any surface water run-off collecting in excavations will likely contain a high sediment load. This will not be allowed to directly discharge to any stormwater sewer, drainage ditch or watercourse.

Figure 6-11 20m Buffer Zone Artificial Ponds and Drainage On Site (Source: Hyphen)

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6.6.2.3 Cement/concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer subject to agreement with Uisce Éireann (Irish Water) / WCC.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the site will be suitably trained in the implementation of the procedures.

6.6.2.4 Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground of fuels and other construction chemicals and prevent any resulting to surface water (and groundwater) systems:

- Designation of bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used, the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;

- The pump or valve will be fitted with a lock and will be secured when not in use;
- All bowsers to carry a spill kit and relevant operatives must have spill response training;
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

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In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated bunded refuelling areas, which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

6.6.2.5 Wastewater Management

Foul wastewater arising from the site will be managed and controlled for the duration of the construction works.

Foul water from the offices and welfare facilities on the site will be collected in portable sanitary facilities and disposed of appropriately by licenced contractor.

The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.

6.6.2.6 Surface Water and Groundwater Flow and Quality

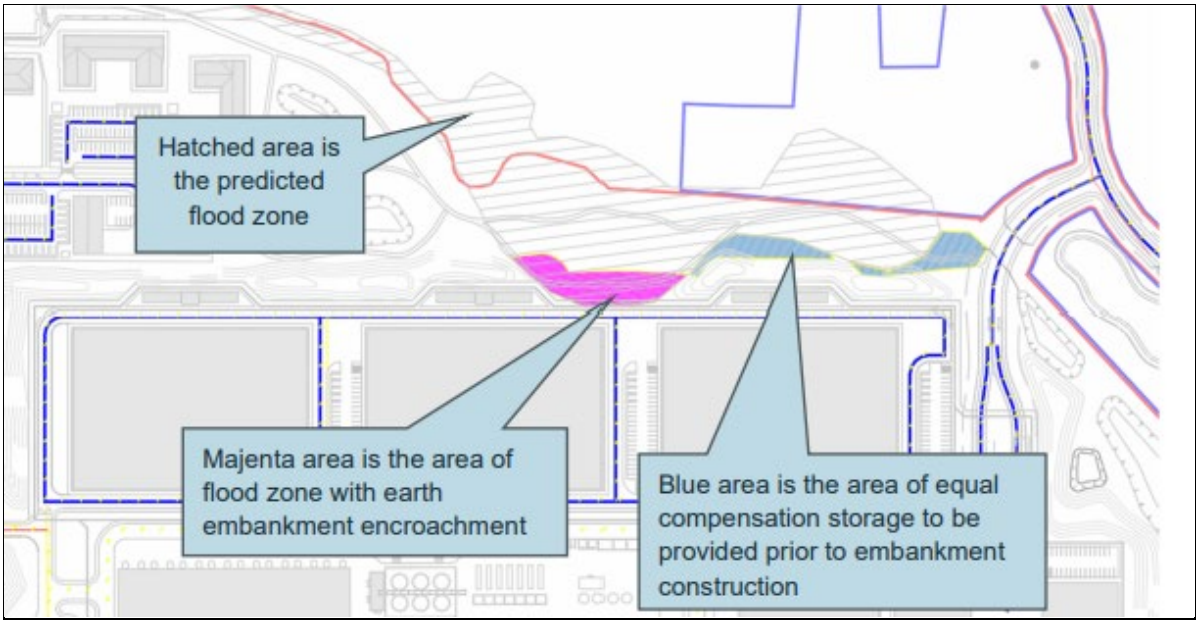
Surface water discharge from the site will be managed and controlled for the duration of the construction works until the surface water drainage system of the proposed development is complete.

No instream works are required for the construction of the proposed bridge crossing on the Whelanbridge Trib 1. The bridge has been designed for 100yr flood event with a minimum of 300mm freeboard. A specific method statement will be prepared for approval of the OPW and Local authority prior to commencement of construction works to insure protection of water quality during construction works. The method statement will include best practice measures as outlined in the "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) and "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)".

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For the construction of the data centres, it will be required to raise the levels to a suitable height. Part of the area of construction of the earth embankments will be within the identified flood zone on site. To mitigate this, it is proposed to lower the levels of lands adjacent to provide equal compensation storage. This should be provided prior to the construction of the earth embankment such that the current flood storage volume is never decreased below the current volume i.e compensation storage as outlined in Figure 6-12 below.

Figure 6-12 Compensation storage (Engineering Report, Atkins, 2025)



6.6.2.7 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies or Surface Water Drinking RPA located downstream in the Whelanbridge River, Whelanbridge Trib 1 or the Lower River Suir SAC. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the proposed development site.

As there is no source pathway linkage, no mitigation is required.

6.6.2.8 Potential Impacts on Water Framework Directive Status

It has been established (refer to Section 6.5.1.4 above) that there is a potential of accidental discharges during the construction phase. However, these are temporary short-lived events that will not impact on the status of the Whelanbridge River, Whelanbridge Trib 1, The Lower River Suir SAC (Site Code: 002137) or the underlying Waterford groundwater body (GWB) in the long-term. As such the proposed development will not cause any significant deterioration or change in water quality status or prevent attainment, or

potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

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On a precautionary basis, the mitigation measures set out in Section 6.6.1 will be implemented during the construction works for the protection of surface water and groundwater quality.

6.6.3 Operational Phase

6.6.3.1 Surface Water and Groundwater Quality

The design has taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts. The surface water design approach taken will comply with the key design criteria set out in the Greater Dublin Regional Code of Practice for Drainage Works.

The proposed surface water management design establishes a hydrological connection to the Whelanbridge Trib 1, located along the eastern boundary of the site, during the operational phase. This design includes two (2) no. discharge locations for the village centre and one (1) no. for the technology park.

To mitigate potential contamination from surface water runoff, which may originate from roads, car parks, and hardstanding areas, a sustainable drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting surface water bodies like the Whelanbridge River, Whelanbridge Trib 1, the Upper Suir Estuary transitional waterbody and the Lower River Suir SAC; as well as groundwater bodies, including the Waterford GWB underlying the site.

The surface water drainage strategy integrates various measures, including porous asphalt in car parks, filter drains and swale drains in open spaces, permeable paving (Grasscrete) around the buildings, attenuation ponds, infiltration tanks, and a rainwater harvesting system. These features will effectively manage surface water flows, directing them to the attenuation ponds and infiltration tanks to maximize their storage potential. The flow control devices will be installed downstream of the ponds outlet pipes to ensure the surface water runoff is stored maximising storage potential, prior to entering the network downstream i.e. the Whelanbridge Trib 1 located along the sites eastern boundary.

The proposed surface water design was designed to provide the following, including a 20% climate change;

- No surcharging in the 1 in 5-year storm event. Pipes immediately upstream of flow control devices may encounter small amount of surcharging due to the flow being throttled accordingly.
- No Flooding in the 1 in 30-year storm event.
- No flooding against a 1 in 100-year storm event or controlled flooding allowing the volume to be contained on site and not impact the surrounding infrastructure.
- The total maximum attenuated volume of water stored in all the attenuation ponds for the 100-year event was calculated to be 7905.1m^3 for the Technology Park and 2025.5m^3 for the Village Centre.

The system shall also incorporate an overflow on the most downstream hydro-brake manhole. The overflow shall consist of a high-level overflow pipe provided to allow water escape should the hydro-brake block or malfunction, or to cater for high water levels created by a storm greater than the design storm (100-year).

Furthermore, the use of hydrotreated vegetable oil (HVO) instead of bulk diesel for back up generators, will further mitigate potential impacts on local hydrology and hydrogeology in the event of a spill/leak

(refer to Section 6.5.2). Storm drainage from the generator yards is drained through an oil interceptor to treat any accidental leaks.

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Refer to the Engineering Report, prepared by AtkinsRéalis Ireland Limited in December 2024 submitted as part of the planning application for further information on the proposed storm water management and design.

6.6.3.2 Surface Water and Groundwater Flow and Quantity

The proposed incorporation of hardstand area and the use of SUDs design measures will have a minor effect on local recharge to ground and has the potential to result in increased run-off from the site if not adequately mitigated.

The proposed incorporation of hardstand areas and the implementation of Sustainable Urban Drainage Systems (SuDS) design measures will have a minor effect on local groundwater recharge and may lead to increased runoff from the site if not properly managed. However, the overall impact on the groundwater regime is expected to be insignificant, given the site's area relative to the total aquifer area. Additionally, the natural recharge capacity of the underlying "Regionally Important Aquifer – Fissured Bedrock" (Rf) supports the maintenance of groundwater levels.

An increase in surface water runoff could adversely affect the hydrological regime of downstream environments, potentially causing flooding and inundation of downstream properties. It is important to note that majority of the proposed development is located in flood zone c while small portion of the development (earthwork embankments) is constructed in flood zones A & B . It is proposed to keep all construction out of the areas identified as having localised flooding, completely mitigating any flood risk.

To mitigate these risks, the design of the development and its drainage infrastructure will ensure that runoff rates are restricted to those of greenfield conditions. The development will incorporate SuDS and an attenuation system, with a design that includes a 20% allowance for climate change. The proposed surface water management strategy aims to prevent surcharging during a 1 in 5-year storm event, eliminate flooding during a 1 in 30-year storm event, and either prevent flooding or control flooding during a 1 in 100-year storm event, thereby containing runoff on-site and protecting surrounding infrastructure.

The ground under the panels shall be maintained as grassland which will serve to reduce the risk of erosion and limit surface water flows across the site. The operation and maintenance of the solar farm shall include monitoring and maintenance of the grassland beneath the panels. Where compaction of soil is observed, the ground will be cultivated and re-seeded. The solar farm has been designed with a network of filter drains incorporating perforated pipes to manage surfacewater runoff generated across the site. These drains intercept and slow down the flow of water, preventing the formation of heavy sheet flow caused by the solar panels. Each filter drain consists of a perforated pipe, typically 100–150 mm in diameter, surrounded by a layer of stone. The undersized pipe restricts flow, causing water to surcharge into the stone surround, which temporarily stores the runoff. This design allows the filter drains to function simultaneously as reservoirs, infiltration systems, and flow control devices. The drainage network ultimately discharges to the river located north of the solar farm. At intervals, sections of the system are constructed with pipe only, without the surrounding stone. These breaks create intentional bottlenecks, forcing water stored in the stone layer to pass solely through the pipe. This further reduces flow rates and enhances the system’s ability to control discharge volumes

Furthermore, there are no proposed surface water or groundwater abstractions, eliminating potential impacts on the quantity of surface water or groundwater resources.

6.6.3.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies or Surface Water Drinking RPA located downstream in the Whelanbridge River,

Whelanbridge Trib 1 or the Lower River Suir SAC. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the proposed development site.

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As there is no source pathway linkage, no mitigation is required.

6.6.3.4 Water Framework Directive Status

There is a potential risk of accidental discharges during the operational phase from car parking areas, roads and HVO during delivery (as detailed in Section 6.5.2). However, these events are temporary and short-lived, with no long-term impact on the status of the Whelanbridge River, Whelanbridge Trib 1, the Lower River Suir SAC (Site Code: 002137), or the underlying Waterford groundwater body (GWB).

Consequently, the proposed development will not lead to any significant deterioration or changes in water quality status, nor will it hinder the achievement of the Water Framework Directive (WFD) objectives or the goals outlined in the third cycle river basin management plan (2022-2027), specifically the Water Action Plan 2024 for Ireland.

Limited surface water discharges during the operational phase will occur to the Whelanbridge Trib 1, located along the site's eastern boundary (refer to Section 6.4.2). However, these discharges will be effectively managed through Sustainable Urban Drainage Systems (SuDS) measures, including porous asphalt for the proposed car parks, filter drains/swale drains along the drainage route in open spaces, permeable paving (Grasscrete) outside the proposed building, as well as attenuation ponds, an infiltration tank, and rainwater harvesting. All surface water flows from the proposed development will be directed efficiently to the attenuation ponds and infiltration tank, maximizing their potential. Flow control devices will be installed downstream of the ponds outlet pipes to ensure that surface water runoff is stored effectively, optimizing storage capacity before entering the downstream network.

According to Uiscé Éireann's (Irish Water) Wastewater Treatment Capacity Register (June 2023), there is capacity available at Ballyduff Lower-Kilmeaden WWTP. Therefore, the proposed peak effluent discharge calculated for the proposed development is not likely to have an impact on the capacity at Ballyduff Lower-Kilmeaden WWTP or the overall water quality within the Whelanbridge River, the Lower River Suir SAC or the Waterford GWB and therefore would likely not have any impact on the current Water Body Status (as defined within the Water Framework Directive). In addition, the proposed development will not contribute any additional stormwater drainage to Ballyduff Lower-Kilmeaden WWTP.

No further mitigation is required.

6.7 Monitoring or Reinstatement Measures

6.7.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no potential for increasing the groundwater vulnerability to contamination in case of accidental spills or discharges.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. Hence, eliminating the risk of contaminated runoff to surface or groundwater.

Therefore, no monitoring is required.

6.7.2 Construction Phase

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During construction phase the following monitoring measures will be considered.

- Monitoring will be undertaken in accordance with planning conditions and undertaken by the contractor in compliance with the project CEMP.
- Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping.
- Buffers along existing ponds, drainage ditches and streams ill be fenced off and maintained in grass cover.
- Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt control measures during construction phase is crucial to ensuring that they work as intended.
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).

6.7.3 Operational Phase

No future surface water monitoring is proposed for the village centre development due to the low hazard potential at the site. The energy centre and DC development will operate under an IED licence and monitoring of the surface water and groundwater will be required based on licence conditions.

Hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

6.8 Residual Effects of the Proposed Development

6.8.1 Construction Phase

6.8.1.1 Surface Water and Groundwater Quality

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on surface water and groundwater quality during the construction phase are adequately mitigated. There will be no change to overall flow and quality within the hydrological and hydrogeological regime as a result of construction.

The residual effect on surface water and groundwater quality during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.8.1.2 Surface Water and Groundwater Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on surface water and groundwater flow and quantity during the construction phase are adequately mitigated. There will be no change to overall flow and quality within the hydrological and hydrogeological regime as a result of construction.

The residual effect on surface water and groundwater flow and quantity during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.8.1.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies or Surface Water Drinking RPA located downstream in the Whelanbridge River,

Whelanbridge Trib 1 or the Lower River Suir SAC. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the proposed development site.

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As there is no source pathway linkage, no residual impacts are anticipated on human health and populations.

6.8.1.4 Water Framework Directive Status

Even in the absence of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, there is no predicted degradation on the status of the Whelanbridge River, Whelanbridge Trib 1, The Lower River Suir SAC (Site Code: 002137) or the underlying Waterford groundwater body (GWB) in the long-term (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

The residual effect on Water Framework Directive status during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.8.2 Operational Phase

6.8.2.1 Surface Water and Groundwater Quality

The implementation of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, will ensure that the potential impacts on surface water and groundwater quality once the proposed development is constructed and operational are adequately mitigated.

The residual effect on surface water quality during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

6.8.2.2 Surface Water and Groundwater Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, will ensure that the potential impacts on surface water and groundwater flow and quantity once the proposed development is constructed and operational are adequately mitigated.

The residual effect on surface water and groundwater flow and quantity during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

6.8.2.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies or Surface Water Drinking RPA located downstream in the Whelanbridge River, Whelanbridge Trib 1 or the Lower River Suir SAC. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the proposed development site.

As there is no source pathway linkage, no residual impacts are anticipated on human health and populations.

6.8.2.4 Water Framework Directive Status

Even in the absence of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, there is no predicted degradation on the status of the Whelanbridge River, Whelanbridge Trib 1, The Lower

River Suir SAC (Site Code: 002137) or the underlying Waterford groundwater body (GWB) in the long-term (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

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There are appropriately designed mitigation measures which will be implemented during the operational phase to protect the hydrological and hydrogeological environment (receptors). There is a potential of accidental discharges during the operational phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

Therefore, no residual impacts are anticipated on the Water Framework Directive status. The residual effect on Water Framework Directive status during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the proposed development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

6.9.1 Construction Phase

In relation to the potential cumulative impact on hydrology and hydrogeology during the construction phase, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.
- Contamination of surface water and groundwater from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect surface water and groundwater quality in compliance with legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

The implementation of mitigation and monitoring measures previously detailed above in section 6.6.1 and 6.7.1 as well as the compliance of other developments with their respective planning conditions, will ensure

there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the construction phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

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6.9.2 Operational Phase

In relation to the potential cumulative impact on hydrology and hydrogeology during the operational phase, the operational activities which would have potential cumulative impacts are as follows:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the site. Cumulatively this development and others in the area will result in localised reduced recharge to ground and increase in surface run-off.
- Increased risk of accidental discharge of hydrocarbons from car parking areas, and along roads is possible unless diverted to surface water system with petrol interceptor.
- There will be a small loss of greenfield area locally as part of the proposed development.

Each specialist has considered the list of relevant planning permissions from the surrounding areas of the proposed development as presented in Chapter 2 – Description of Proposed Development - Appendix 2.1. The proposed development and other permitted developments will result in an increase in hard standing which will result in localised reduced recharge to ground.

The proposed development site is underlain by a "*Regionally Important Aquifer – Fissured Bedrock*". There is no potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the natural recharge capacity of the underlying aquifer which allows for the maintenance of groundwater levels.

The implementation of SuDs measures on site will mitigate against and reduce the recharge rate to ground.

All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

The implementation of mitigation and monitoring measures previously detailed above in section 6.6.2 and 6.7.2 as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the operational phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

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Chapter 7 – Biodiversity

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7. BIODIVERSITY

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7.1 Introduction

This chapter of the EIAR deals with the biodiversity associated within the receiving environment of the proposed project planning area and within a wider Zone of Influence in the vicinity of the Proposed Development at Kilmeaden. This report comprises the information required by Annex IV to the EIA Directive to be contained in an EIA report in respect of flora, fauna and avifauna. The aims of this ecological impact assessment are to:

- Establish baseline ecological data pertaining to the site and identify Key Ecological Receptors.
- To assess the ecological value of the identified Key Ecological Receptors.
- To identify describe and quantify the significant likely effects of the Proposed Development on Key Ecological Receptors.
- To compose a suite of mitigation measures to avoid, prevent, reduce and offset likely significant negative impacts on Key Ecological Receptors.

A full description of the Development is provided in EIAR Chapter 2: Description of the Proposed Development. For the purposes of this chapter a short description is provided for ease of reference.

The Proposed Development at Kilmeaden, Co. Waterford comprises four distinct but connected areas including a new village center, a solar farm and rewilding area including grid scale battery storage, and a data center with associated energy center. The biodiversity of each of these four locations is outlined in this chapter in their totality and not as individual units within the red line boundary due to the complexity of ecological relationships at landscape level.

A Natura Impact Statement has been prepared with regard to the proposed development and accompanies this EIAR in a separate document.

7.2 Methodology

In accordance with the requirements of Directive 2014 / 52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92 / EU on the assessment of the effects of certain public and private projects on the environment (referred to as "the EIA Directive"), this Chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on biodiversity, with particular attention to species and habitats protected under both EU and Irish law.

The EIA Directive does not provide a definition of biodiversity. However, as noted in the European Commission, "Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment" (European Commission, 2013), Article 2 of the Convention on Biological Diversity, gives the following formal definition of biodiversity: 'biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems' (CBD 2006).

Alongside the term 'biodiversity' the terms 'ecology' and 'ecological' are also used throughout this Chapter as broader terms to consider the relationships of biodiversity receptors with one another and with the wider environment. This Chapter also refers to the Appropriate Assessment Screening Report (hereafter referred to as the AA Screening Report) and the Natura Impact Statement (hereafter referred to as the NIS) which have been prepared and submitted with the application for approval, so as to enable the C0ompetent Authority, to carry out the assessments required.

Surveys were undertaken during the optimal season (September 2024 – June 2025). A review of the Proposed Development was undertaken which identified numerous Key Ecological Receptors (KERS) within the area of study that could potentially be impacted by the Proposed plan. The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant effects of the Proposed Development are detailed in the following sections.

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7.2.1 Desk Study

7.2.1.1 Recent land use based on satellite imagery

Images from Google Earth Pro were analyzed using the "Show historical imagery" function of Google Earth, enabling satellite images of the subject site to be viewed from 2003, 2009, 2015, 2017, 2018 and 2020. This facilitates a visual comparison of land use over time.

7.2.1.2 NPWS database

The primary body consulted with regard to matters involving ecology within the Republic of Ireland is the National Parks and Wildlife Service (NPWS). The role of the NPWS is:

- To secure the conservation of a representative range of ecosystems and maintain and enhance populations of flora and fauna in Ireland;
- To implement the EU Habitats and Birds Directives;
- To designate and advise on the protection of Natural Heritage Areas (NHA) having particular regard to the need to consult with interested parties;
- To make the necessary arrangements for the implementation of National and EU legislation and policies and for the ratification and implementation of the range of international Conventions and Agreements relating to the natural heritage; and
- To manage, maintain and develop State-owned National Parks and Nature Reserves.

The desk study involved querying the NPWS database for information pertaining to designated sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA), Natural Heritage Areas (NHA) and Proposed Natural Heritage Areas (pNHA)) occurring proximate to the Proposed Development – 5 km for NHAs/pNHAs, 15km in the case of Natura 2000 sites. This buffer was then utilised to identify sites with which there was a Source-Pathway-Receptor linkage as per "OPR Practice note PN01 – "Appropriate Assessment Screening for Development Management". Office of the Planning Regulator (2021)."

7.2.1.3 NBDC Database

In addition to consulting the NPWS database, the National Biodiversity Data Centre Database was consulted regarding species of conservation concern recorded as occurring within the vicinity of the study area within a user defined polygon.

7.2.1.4 Objectives of relevant Local Authority Plans

A review of the Objectives outlined in relevant Local Authority Plans that relate to the Proposed Development was undertaken. These Local Authority Plans included:

- Waterford City and County Development Plan 2022-2028 Chapter 11 Heritage
- Waterford City and County Development Plan 2022-2028 Chapter 9 Climate Action, Biodiversity and Environment

7.2.1.5 Relevant Guidelines, Policy and Legislation

The assessment supporting this Chapter has been undertaken in accordance with the following guidance documents:

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guidelines) (CIEEM 2018);
- National Road Authority (NRA) Guidelines for the Crossing of Watercourses during the Construction of National Road Developments. National Roads Authority (NRA 2005a);
- Guidelines for the Treatment of Badgers prior to the Construction of National Road Developments. National Roads Authority (NRA 2005b);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Developments. National Roads Authority (NRA 2006a);
- Guidelines for the Treatment of Otters prior to the Construction of National Road Developments (NRA 2006b);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Developments (NRA 2008a);
- Environmental Impact Assessment of National Road Developments – A Practical Guide. (NRA 2008b);
- Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009);
- The Management of Invasive Alien Plant Species on National Roads - Technical Guidance (TII 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, J (ed.) 2016);
- The Bat Workers' Manual (Mitchell-Jones and McLeish 1999);
- Bat Mitigation Guidelines for Ireland V2. Irish Wildlife Manuals No. 134 (Marnell, Kelleher and Mullen 2022);
- The Irish Bat Monitoring Programme 2015 - 2017. Irish Wildlife Manuals 103. (Aughney et al. 2018);
- United Kingdom Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) (UKHA 2001a; UKHA 2001b; UKHA 2005);
- National Parks and Wildlife Service (NPWS) Circular NPW 1 / 10 & PSSP 2 / 10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities (NPWS 2010);
- Circular Letter NPWS 2 / 07 Guidance on compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species / applications for derogation licences (NPWS 2007a);
- Circular Letter PD 2/07 and NPWS 1 / 07 Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites (NPWS 2007b); and
- All-Ireland Pollinator Plan 2021-2025, National Biodiversity Data Centre Series No. 25, Waterford. March 2021(NBDC 2021).

It should be noted that in some instances standard survey methodology described in some of the guidance documents listed above was modified for practical reasons.

Policy and Planning Documents:

- Department of Culture, Heritage and the Gaeltacht (DCHG) National Biodiversity Plan 2017 - 2021 (DCHG 2017);
- Waterford City and County Development Plan 2022-2028 Chapter 11 Heritage

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- Waterford City and County Development Plan 2022-2028 Chapter 9 Climate Action, Biodiversity and Environment

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Legislation:

- The Habitats Directive;
- The Birds Directive;
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 477 / 2011 - European Communities (Birds and Natural Habitats) Regulations 2011, as amended (hereafter referred to as the Birds and Habitats Regulations);
- The EIA Directive;
- Planning and Development Act 2000 (as amended);
- Wildlife Acts 1976 to 2022; • S.I. No. 235 / 2022- Flora (Protection) Order, 2022 (hereafter referred to as the Flora Protection Order); and,
- Inland Fisheries Acts 1959 to 2019.

7.2.1.6 Consultees

Marina Mulligan, Waterford County Council's Biodiversity Officer, pointed out key areas of sensitivity on site and within the Zone of interest of the site. Ms. Mulligan also stressed the fundamental importance of having future goals for biodiversity and the importance of establishing biodiversity gains.

7.2.1.7 Data Collection and Collation

A desk study involved collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with the Waterford County Council Biodiversity Officer, Marina Mulligan. The following sources were consulted during the desk study to inform the scope of the ecological surveys:

- Online data available on European sites and on Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) as held by the NPWS (NPWS Database 2022);
- Online data records available on National Biodiversity Data Centre Database (NBDC Online Database 2022);
- Ordnance Survey Ireland (OSI) orthophotography (from 1995 to 2012) for the Proposed Development study area;
- Records of rare and / or protected species for the 10km grid squares held by the NPWS;
- Habitat and species GIS datasets provided by the NPWS, including Article 12 and Article 17 data;
- Bat records from Bat Conservation Ireland's (BCI) database;
- Records from the Botanical Society of Britain and Ireland (BSBI);
- Information on the status of European Union (EU) protected habitats and species in Ireland (NPWS 2019a, NPWS 2019b and NPWS 2019c).

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Development. Construction methodologies for the Proposed Development do not involve in-stream works, modifications to banks or significant disturbance as a result of the Proposed Development.

7.2.2 Ecological surveys

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This Section describes the various ecological survey methodologies used to collate baseline ecological information in the preparation of this Chapter. The ecological surveys carried out are summarized in Table 7-1.

Table 7-1 Survey information.

Survey type	Timeline	Surveyors
Habitat survey	September 2024-June 2025	Dr. Emma Reeves, Ciarán Byrne, Senan Clynch
Non-volant mammal surveys	September 2024-June2025	Dr. Emma Reeves Senan Clynch
Potential hibernacula survey	13th December 2024	Dr. Emma Reeves
Winter bat surveys	20th January – 12th February	Dr. Emma Reeves/Dr. Patrick Moran
Summer bat surveys	May/June 2025	Dr. Emma Reeves/Dr. Patrick Moran
Breeding Bird surveys	March 2025-June 2025	Dr. Emma Reeves
Wintering bird surveys	September 2024– March 2025	Dr. Emma Reeves
Amphibian assessment	March/April 2025	Dr. Emma Reeves
Reptile assessment	April 2025-June 2025	Dr. Emma Reeves, Senan Clynch
Kingfisher survey of the Whelan's bridge River and tributary	April 3rd 2025	Dr. Emma Reeves
Otter survey of the Whelan's bridge River and tributary	April 3rd 2025	Dr. Emma Reeves
Freshwater Pearl Mussel survey	April 3rd 2025	Dr. Emma Reeves
White-clawed Crayfish survey	April 3rd 2025	Dr. Emma Reeves
Kingfisher survey of the Whelan's bridge River and tributary	May 14th 2025	Dr. Emma Reeves
Otter survey of the Whelan's bridge River and tributary	May 14th 2025	Dr. Emma Reeves
Freshwater Pearl Mussel survey	May 14th 2025	Dr. Emma Reeves
White-clawed Crayfish survey	May 14th 2025	Dr. Emma Reeves
Invasive Alien Plant Species	September 2024-June 2025	Dr. Emma Reeves
Habitat mapping	February 2025– June 2025	Dr Emma Reeves/Senan Clynch

7.2.2.1 Botanical/Habitat surveys

All habitats located within the application footprint were surveyed and mapped to level three of the Heritage Council's A Guide to Habitats in Ireland habitat codes, after Fossitt (Fossitt 2000) and in accordance with Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011).

Non-native invasive plant species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) were also recorded. The habitat's extent was mapped onto an aerial photograph, with Global Positioning System (GPS) points taken where a habitat's extent could not be clearly identified from the aerial photograph. Vascular plant nomenclature follows that of the New Flora of the British Isles Fourth Edition (Stace 2019). Botanical/Habitat surveys were undertaken on a monthly basis from September 2024 to June 2025) by Dr Emma Reeves. Nomenclature follows "Webb's An Irish Flora" (2012 – 8th Edn) and "Mosses and Liverworts of Britain and Ireland a Field Guide" (2010). During all site visits, any previously unrecorded species of flora were added to the site list. A full species list is contained in Appendix 1.

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7.2.2.1.1 Survey Methodology

Comprehensive flora surveys have been carried out on the site in the optimum timeframe for ecological research. All species of flora occurring within the study area have been surveyed in addition to recording relevés within representative areas of habitat. The botanical survey places particular emphasis on rare, protected, or annexed habitats/species by reference to -

- Irish Plant Red Data Book;
- Habitats listed on Annex I of the EU Habitats Directive;
- Species listed on Annex II of the EU Habitats Directive; and
- Ecological steppingstones and ecological corridors (as covered under Article 10 of the EU Habitats Directive.

A written description of habitats within the receiving environment was compiled, to include the dominant species occurring (A botanical species list is presented in Appendix 1). Photographs of representative areas of habitat are presented. An evaluation of the ecological significance of flora and habitats occurring within the site relative to surrounding habitats was also undertaken. No Flora Protection Order species or Red-listed plant species were observed during surveys.

7.2.2.2 Watercourse Surveys

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Development. The Whelan's Bridge River tributary is the only watercourse with potential to be affected by the Proposed Development. See hydrology and hydrogeology chapter for full description. The Whelansbridge river itself runs along the northwestern site boundary - alongside the solar farm part of the site

7.2.2.3 Hedgerow survey methodology

A hedgerow survey was carried out in March 2025 based on the methodology developed by Foulkes *et al* 2013. This survey was conducted during the optimal timeframe for hedgerow assessment.

The methodology comprises a standard recording methodology, allowing for consistency of recording of all hedgerow survey data in addition to a method for data appraisal to maximize the value of the data collected. This is particularly useful in identifying and assessing the condition of hedgerows of ecological, historical and landscape significance. Through the utilization of this Hedgerow Appraisal System, the biodiversity and heritage value of the hedgerow and ditch network within the site were comprehensively assessed.

7.2.2.4 Species of Invasive Alien Plants listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended)

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The human introduction of alien plant species into ecosystems (intentionally or unintentionally) is historically a common-place occurrence. The vast majority of these alien plant species, when introduced into a foreign ecosystem for which they are not adapted, will die without specific care. In a small number of cases, however, these plants can come to dominate the ecosystem into which they have been introduced and become "Invasive". There is presently a great deal of concern regarding the potential for invasive plant species to threaten the species composition, community structure and overall biodiversity of native Irish habitats. Invasive species can change the character and/or condition of an ecosystem over an extensive area through several mechanisms, depending on the species of plant and the nature of the habitat. There are more than 30 species on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended). Aquatic systems are particularly vulnerable to plant invasions owing largely to the naturally high disturbance frequencies within aquatic habitats and the rapidity with which an invasive can spread utilizing the medium of water. In addition, there has been an historic tendency for people to plant "ornamental" species beside water. As a result, the vast majority of the species listed on the Third Schedule are associated broadly with aquatic systems (see Table 7-2).

Table 7-2 List of plant species appearing on the Third Schedule (as amended by SI 355/2015)

Common Name	Latin Name	Associated with freshwater habitats
American skunk-cabbage	*Lysichiton americanus*	Yes
Red alga	*Grateloupia doryphora*	No
Brazilian giant-rhubarb	*Gunnera manicata*	Yes
Broad-leaved rush	*Juncus planifolius*	Yes
Cape pondweed	*Aponogeton distachyos*	Yes
Cord-grasses	*Spartina (all species hybrids)*	No
Curly waterweed	*Lagarosiphon major*	Yes
Dwarf eel-grass	*Zostera japonica*	No
Fanwort	*Cabomba caroliniana*	Yes
Floating pennywort	*Hydrocotyle ranunculoides*	Yes
Fringed water-lily	*Nymphoides peltata*	Yes
Giant hogweed	*Heracleum mantegazzianum*	Yes
Giant knotweed	*Fallopia sachalinensis*	Yes
Giant-rhubarb	*Gunnera tinctoria*	Yes
Giant salvinia	*Salvinia molesta*	Yes
Himalayan balsam	*Impatiens glandulifera*	Yes
Himalayan knotweed	*Persicaria wallichii*	Yes
Hottentot-fig	*Carpobrotus edulis*	No
Japanese knotweed	*Fallopia japonica*	Yes
Large-flowered waterweed	*Egeria densa*	Yes

Mile-a-minute weed	*Persicaria perfoliata*	Yes
New Zealand pigmyweed	*Crassula helmsii*	Yes
Parrot's feather	*Myriophyllum aquaticum*	Yes
Rhododendron	*Rhododendron ponticum*	No
Salmonberry	*Rubus spectabilis*	Yes
Sea-buckthorn	*Hippophae rhamnoides*	No
Spanish bluebell	*Hyacinthoides hispanica*	No
Three-cornered leek	*Allium triquetrum*	No
Wakame	*Undaria pinnatifida*	No
Water chestnut	*Trapa natans*	Yes
Water fern	*Azolla filiculoides*	Yes
Water-primrose	*Ludwigia* (all species)	Yes
Waterweeds	*Elodea* (all species except *E. canadensis*)	Yes
Wireweed	*Sargassum muticum*	Marine/transition

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The surveys for Alien Invasive Species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as Amended) consisted of walk-over surveys throughout the application site and were undertaken by Dr Emma Reeves between September 2024 and June 2025.

7.2.2.5 Habitat Mapping/GIS

Field maps were prepared utilizing the OSI 1:5000 vector boundaries as a base-map in addition to the digital globe satellite imagery (ESRI). Field maps were prepared prior to surveys, allowing surveyors to mark pertinent information (field number, habitat type, etc.) on field maps. These maps were then utilised to generate a habitat map in ArcGIS Pro. Habitat mapping was carried out based on "Best Practice Guidance for Habitat Survey and Mapping" (Smith et al 2011). All GIS data was prepared utilizing the ITM coordinate system. Drone surveys were conducted using a Mavic Pro (weighing less than 1kg) surveys were undertaken when weather conditions permitted during February, March and April 2025. These surveys were used to better inform the production of Habitat maps.

7.2.2.6 Bird Surveys

7.2.2.6.1 Winter Bird Surveys

Winter bird surveys were carried out within the receiving environment during September 2024 to March 2025.

Bird Watch Ireland and the RSPB NI have agreed a list of priority bird species for conservation action on the island of Ireland. These Birds of Conservation Concern in Ireland are published in a list known as the BoCCI List. In this BoCCI List, birds are classified into three separate lists (Red, Amber and Green), based on the conservation status of the bird and hence conservation priority. The Red List birds are of high conservation concern, the Amber List birds are of medium conservation concern, and the Green List birds are not considered threatened.

Field surveys were undertaken by Dr Emma Reeves during the period September 2024 – March 2025 utilizing transects through the application site following a modified common bird census or

Brown & Shepherd survey. Transects were walked at a slow pace, with all bird species observed recorded and identified (the surveyor had standard equipment including 10X42 binoculars, Spotting Scope and Helion Pulsar XP 50 thermal imaging camera for post sunset surveys). Bird activity was also noted (i.e. if a flock of birds were observed flying overhead as opposed to foraging within fields). Transects utilised were chosen on the basis of accessibility, habitat type, daylight and visibility. Transects also varied according to weather conditions. Although the exact same transects paths were not utilised for each survey, the use by avifauna of the entire area of the Proposed application site and indeed a significant area outside of the application area, were observed during all surveys.

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Surveys were undertaken at both rising/high and falling/low tide (generally based approximately on the Waterford tide time-tables (Tides near me App for IOS, with an hour either side) to account for bird movements associated with tidal variations. Post sunset surveys (utilizing a thermal camera) were also undertaken to identify if flocks of species such as Golden Plover or Lapwing arrived at the site to forage post sunset.

Tidal surveys were conducted with 10X42 binoculars and a spotting scope from approximately:

High Tide - Approximately one-hour pre high tide until one hour post high tide;

Low tide - Approximately one-hour pre low tide until one hour post low tide.

Post sunset surveys were undertaken utilizing a Pulsar Helion XP50 thermal imaging camera to identify nocturnal usage of the application site for a period of approximately one hour post sunset.

This schedule of surveys was carried out on a monthly basis during the period September 2024 – March 2025 inclusive.

7.2.2.6.2 Breeding Bird Surveys

Breeding bird surveys were undertaken during the optimal window in March-June 2025. These surveys entailed the compilation of McKinnon lists while walking transects through the application area. The McKinnon List methodology provides a proxy of species frequency throughout the site.

Deployment of Song micro-meters throughout the site was carried out during the breeding season to assess the breeding bird population. These were deployed on the 24th of March 2025, April 14th and June 6th (see Figure 7-1). A map of the deployment locations is also included in Figure 7-3.

The purpose of the bird surveys was to:

- To record any priority species (Annex I, Red or Amber listed) and assess their breeding status within the site;
- To identify any areas of habitat of particular interest with regard to avian biodiversity.

Figure 7-1 Deployed Song Meters at various locations on site.



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A search along the banks of the Whelan's bridge River was conducted to assess the potential for Kingfisher activity and to assess the suitability of the riverbank for kingfisher burrows. This was achieved by walking upstream within the river allowing surveys of both riverbanks.

7.2.2.6.3 Breeding Wader Surveys

Breeding wader surveys were completed during May 2025 based on the methodology utilised for the 2015 National Breeding Curlew Survey.

7.2.2.7 General (non-volant) Mammal survey

General mammal surveys, and crepuscular surveys were undertaken at the application site and immediate vicinity (i.e. within 100m) by Dr Emma Reeves during monthly site visits from September 2024 to June 2025. In addition to surveys of the area of the Proposed Development site through direct observations (seeing the animal), observation of faeces, prey remains, shelters, hair, etc., Infrared trail cameras (Bushnell Core DS No Glow, Bushnell Aggressor No Glow) were deployed at the site on March 24th until April 4th 2025. The cameras were put in three locations where mammal activity was deemed likely. These locations are shown in Figure 7-3, pictures of the trail cameras are shown in Figure 7-2. Otter surveys were carried out on the Whelan's Bridge River on the 3rd of April and 14th of May by walking the river length allowing both sides of the river to be surveyed for holts and signs of activity.

Figure 7-2 Trail cameras deployed onsite. From left to right; on the Whelan's Bridge River, within the Spruce Wood and at the Whelan's Bridge River tributary

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Figure 7-3 Deployment locations of trail cameras and song meters.



7.2.2.8 Otter Survey

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Otter (*Lutra lutra*) is a primarily piscivorous species, depending largely on salmonids but also consuming frogs, crayfish, etc. Otter can travel overland to reach food sources[1]. Surveys were undertaken based on the methodology utilised during the "The National Otter Survey of Ireland 2010/12" (Reid et al 2013)[2], with a survey being carried out for holts, spraints, tracks, prey-remains, slides, couches, etc. along the length of the stream as it flows through the survey area. The vegetation on both sides of the stream is overgrown for much of the stretch of stream occurring and surveying from the bank was deemed not feasible. The stream is shallow as it occurs within the survey area, permitting in-stream survey. In stream surveys were undertaken by Dr Emma Reeves on the 04th of April 2025 and 14th of May 2025. Surveys commenced at the southern bridge over the Whelan's Bridge River to the bridge on the northern boundary of the site. The Whelan's Bridge River tributary was accessed at the northeastern boundary to the eastern boundary of the site.

Walk over surveys around suitable habitat for Otter for indications of otter presence were conducted during the period of September 2024 to June 2025.

7.2.2.9 Kingfisher survey

The Whelan's Bridge River and tributary was walked in an upstream direction to assess the presence of kingfisher to evaluate the presence of suitable banks for Kingfisher nests. A trail camera was deployed along the river and the tributary to capture images of Kingfisher. Kingfisher are often drawn to new features in the riverine landscape and will investigate them, hence a yellow fence post was driven into the sediment to create a 'perch' thereby increasing the chances of camera capture.

7.2.2.10 Bat surveys

The bat surveys included roost potential surveys and winter bat surveys, conducted using static monitors and summer bat activity surveys. The static units used were Pettersson D500x units. These are ultrasound recording units, intended for long-term recording of bat calls. The triggering system allows the device to start recording as a sound is detected. The D500X detects the full spectrum of ultrasound and records in real time. It provides much more detailed data than either frequency division or time expansion detectors.

7.2.2.10.1 Winter surveys

The presence of potential hibernation roosts was assessed by general walkover survey on the 13th of Dec 2024. A number of derelict buildings remain within the footprint of the demolished Kilmeaden factory. Presumably these buildings functioned as pump houses. Potential bat faeces were found in one of these buildings, prompting further investigation. During the period of January 20th to February 13th, 2025, three Pettersson D500x were deployed, one in each of the buildings shown in Figure 7-4. Unit 2 was stolen and all data lost but data collected is adequate for baseline assessment.

[1] Loy A, Carranza M, Cianfrani C, D'Alessandro E, Bonesi L, Di Marzio P, Minotti M and Reggiani G (2009)*Folia Zoologica (Brno)*, **58(3)**, pp 309 - 326

[2] Reid N, Hayden B, Lundy M, Pietravalle S, McDonald R and Montgomery W (2013). National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Figure 7-4 Structure 1, 2 and 3 containing the Pettersson D500xs



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Figure 7-5 Aerial view of structures 1, 2 and 3 containing the Pettersson D500xs



The Whelan's bridge River is crossed by a bridge to the south of the site within the footprint of the Proposed Development was visually inspected to assess its potential to support roosting bats. This assessment was carried out within the breeding season to accurately assess bat presence/absence. The standard approach uses four grades to determine the likelihood of the bridge supporting a colony (following Billington and Norman, 1997).

- Grade 0 = no potential for bats: These are bridges where there are no opportunities for bats to roost in crevices or under mats of dense ivy. Modern concrete bridges and masonry bridges which have been well-pointed often fall under this category.
- Grade 1 = crevices possibly of use to bats: These are bridges which have small and a limited number of crevices which may be sub-optimal, perhaps due to dampness or localised disturbance. The possibility that bats could use these crevices cannot be entirely ruled out but is regarded to be low.
- Grade 2 = ideal crevices but no bat present: These are generally more substantial crevices, often more than 150mm deep, dry and sheltered which offer good roosting opportunities. No evidence of bats is confirmed. The possibility that bats could use these crevices is regarded to be likely.
- Grade 3 = evidence of bats: Bats are seen in-situ, or their droppings or other field signs are seen.

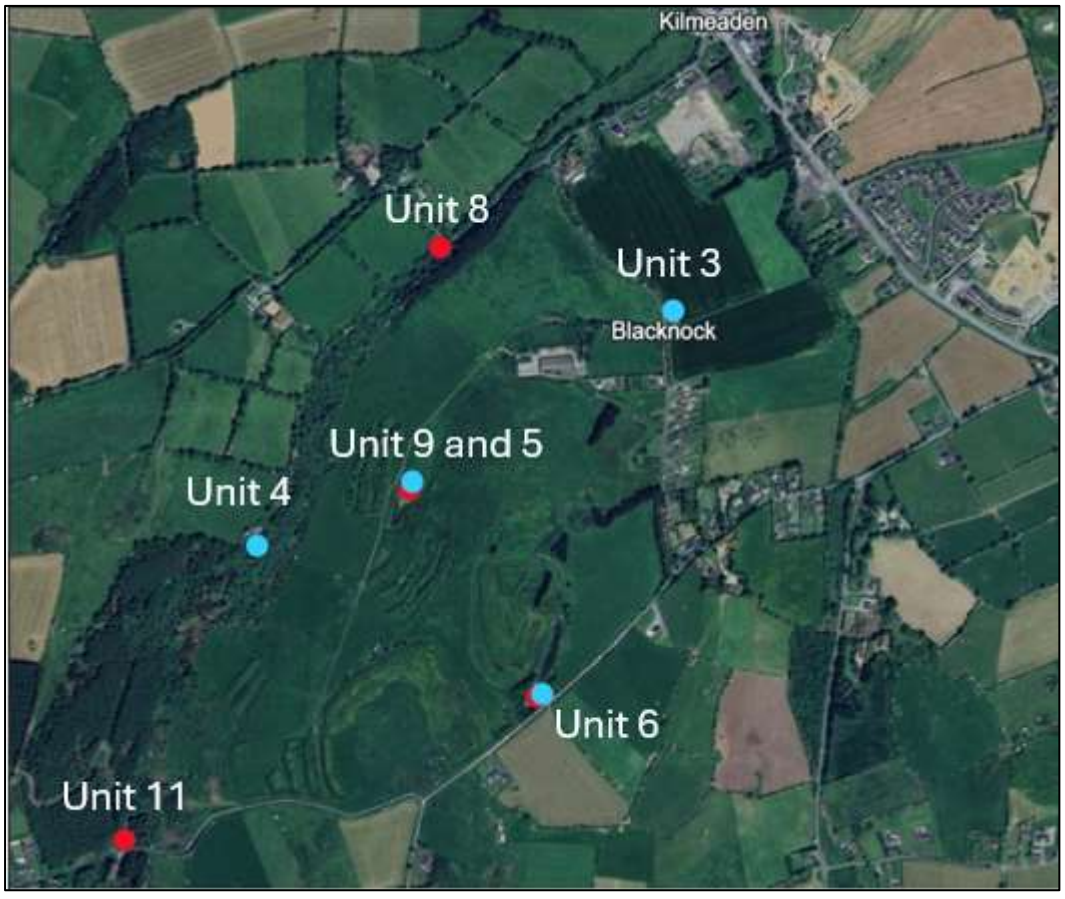
7.2.2.10.2 Summer surveys

There are no habitats suitable for significant roosts to occur within the application area to be impacted upon by the proposed development. In order to assess bat activity, within suitable habitat, four Passive Ultrasound Monitors (PUM) were deployed on site during the period 14/05/25 – 20/05/25/. Activity was further assessed during the period 06/06/25 – 09/06/25 through a combination of PUMs and an emergence and dawn survey, undertaken on 6th June 2025.

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The location of these monitors is outlined in Figure 7.6. These units are capable of recording bats (depending on species) at distances of up to 100m.

Figure 7-6 Location of PUMs during May and June bat activity surveys (red dots indicate May locations, blue dots indicate June locations.



7.2.2.10.3 Emergence/dawn survey

Although no potential roost sites were identified, an emergence and dawn survey were undertaken to further assess activity. The emergence survey was undertaken on the night of the 6th of June 2025. The starting temperature was approximately 10°C, with intermittent rain and gusts of wind. The survey commenced at 21:20 (sunset 21:48) and finished at 23:20. The dawn survey commenced at 03:50 on the morning of 7th June 2025 (sunrise 05:00) under similar environmental conditions to the emergence survey. The dawn survey finished at 5:20am. A transect was walked through the site, utilising an Anabat Walkabout bat detector and Pulsar Helion XP50 thermal camera to record and identify bats.

Figure 7-7 Route taken by surveyors during the emergence and dawn surveys undertaken during the night of June 6th and morning of June 7th. Roads and pathways were preferred for reasons of health and safety



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7.2.2.11 Amphibian and Reptile Survey

A survey of habitat suitable for amphibians (primarily temporary pools or water-filled ditches suitable for spawning Common Frog) within the application site was undertaken on the 25th of March and the 3rd of April. Any sightings of amphibians during the survey period were recorded, individuals were photographed.

A survey for reptiles was carried out by active search for Irelands only native reptile the Viviparous lizard. The site contains many habitats suitable for lizard including a range of grassland, scrub and rock habitats. Preliminary reptile survey was carried out on April 3rd, 2025, by Senan Clynch and Emma Reeves through active search of potential basking areas onsite, for example on the large outcropping rocks located around Blackknock Hill. April is the ideal month to carry out these surveys as the lizard emerges from hibernation and begins courtship and reproduction. Five corrugated black artificial basking mats were deployed onsite on the 3rd April in habitats suitable for lizards to attract basking individuals. Unfortunately, two basking mats were removed prior to

inspection, however, the data collected is adequate for baseline assessment. Figure 7-8 shows an example of the mats onsite in an area of hardstanding to the South of the site.

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Figure 7-8 Artificial basking mat deployed to survey reptile activity onsite



7.2.2.12 White-clawed Crayfish

The Whelan Bridge River is fast flowing with clear water permitting visible inspection of the habitat present. White-clawed Crayfish are a Qualifying Interest of the Lower River Suir SAC. A survey was undertaken in order to establish if White-clawed Crayfish are present along this stretch of the Whelan Bridge River. There are a number of methodologies outlined for survey of White-clawed Crayfish[3]. These methodologies include:

- Indirect surveying – surveying for Crayfish remains – particularly in Otter spraint;
- Trapping – typically utilizing baited funnel traps, which are deployed underwater for 24 hours;
- Sweep-netting – utilizing sweep-nets to kick sample;
- Hand-search – in-stream patch selection and search potential refuges by hand;
- Refuge trap placement – placement and subsequent checking refuges;
- Night-search – in-stream search post sun-set utilizing a torch.

In stream surveys for direct sightings and indirect signs – primarily Crayfish remains were undertaken by Dr Emma Reeves on the 3rd of April and 14th of May. The river was searched in a

[3] Reynolds J, O'Connor W, O'Keeffe C and Lynn, D. (2010) A technical manual for monitoring white-clawed crayfish *Austropotamobius pallipes* in Irish lakes. Irish Wildlife Manuals, No 45, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

zig-zag fashion, with any spraint/droppings observed and investigated for the presence of Crayfish remains.

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7.2.2.13 Freshwater Pearl Mussel

The Whelan Bridge River is fast flowing with clear water permitting visible inspection of the habitat present. Freshwater Pearl Mussel are a Qualifying Interest of the Lower River Suir SAC. A survey was undertaken in order to establish if Freshwater Pear Mussel are present along this stretch of the Whelan Bridge River.

In stream surveys for populations of Freshwater Pearl Mussel were undertaken by Dr Emma Reeves on the 3rd of April and the 14th of May. The river was searched in a zig-zag fashion for any populations of Freshwater Pearl Mussel.

7.2.2.14 Lamprey species

The Whelan Bridge River is fast flowing with clear water permitting visible inspection of the habitat present. Lamprey are a Qualifying Interest of the Lower River Suir SAC. A survey was undertaken in order to establish if Lamprey are present along this stretch of the Whelan Bridge River.

In stream surveys for populations of Lamprey were undertaken by Dr Emma Reeves on the 3rd of April and the 14th of May. The river was searched in a zig-zag fashion for any populations of Lamprey.

7.2.3 Ecological Evaluation and Impact Assessment

7.2.3.1 Criteria for assessing ecological value

The criteria used to assess the ecological value and significance of the application site for habitats and species is based on the guidelines provided in "Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA, 2009)".

7.2.3.2 Criteria for impact assessment

The biodiversity and ecological impacts of the Proposed Development have been assessed using the following guidelines:

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- The EPA Guidelines (EPA 2022);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- CIEEM Guidelines (CIEEM 2018); and,
- Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009).

Impact assessment is undertaken of 'key ecological receptors' (KERs). KERs are within the zone of influence of the Development and are 'both of sufficient value to be material in decision making and likely to be affected significantly'. To qualify as KERs, features must be of local Importance (higher value) or higher. Features of lower ecological value are not assessed. The highest levels of impact significance for each key ecological receptor 'value' rating are shown in Table 7-3.

Biodiversity receptors (including identified sites of biodiversity importance) have been valued with regard to the ecological valuation examples set out in the Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009). These include International Importance, National Importance, County Importance, and Local Importance.

Habitat areas within Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are considered in the context of assessing impacts on the conservation objectives and site integrity of a given European site with regard to the Appropriate Assessment (AA) tests set out in Article 6(3) of the Habitats Directive. An AA Screening Report and Natura Impact Statements have been submitted with the application for approval as to enable the appropriate authority to carry out the requisite assessments for the purposes of Article 6(3) of the Habitats Directive. For the purposes of the appraisal of likely significant effects on biodiversity arising from the Proposed Development, as part of this chapter of the EIAR, all European sites are valued as internationally important.

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In accordance with the Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009), biodiversity features within the ZoI of the Proposed Development which are '*both of sufficient value to be material in decision making and likely to be affected significantly'* are deemed to be KERs. These are the biodiversity receptors which may be subject to likely significant impacts from the Proposed Development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of Local Importance (Higher Value) or greater.

Table 7-3 Maximum level of significance of impacts on Key Ecological Receptors

Key Ecological Receptor Value Rating	Highest Possible Significance Rating
International importance	Significant positive/negative impact at an international level
National importance	Significant positive/negative impact at a national level
County importance	Significant positive/negative impact at a county level
Local importance	Significant positive/negative impact at a local level

The parameters considered in characterizing and describing the magnitude or scale of the likely significant effects of the Proposed Development are outlined in Table 7-4.

Table 7-4 Parameters used to characterise and describe the magnitude or scale of Potential Impacts Parameters

Parameters	Categories
Type of impact	Positive / Neutral / Negative May also include Cumulative Effects, 'Do Nothing Effects', 'Do Minimum Effects', Indeterminable Effects, Irreversible Effects, Residual Effects, Synergistic Effects, Indirect Effects and / or Secondary Effects
Extent	The size of the affected area / habitat and / or the proportion of a population affected by the effect
Duration	The period of time over which the effect will occur*.
Frequency and Timing	How often the effect will occur; particularly in the context of relevant life-stages or seasons
Reversibility	Permanent/Temporary Will an impact reverse; either spontaneously or as a result of a specific action

Note: *The above terms / definitions for describing the duration of impacts are provided in the EPA Guidelines (EPA 2022): Momentary Effects - effects lasting from seconds to minutes; Brief Effects - effects lasting less than a day; Temporary Effects - effects lasting less than a year; Short-term Effects - effects lasting one to seven years; Medium-term Effects - effects lasting seven to 15 years; Long-term Effects - effects lasting 15 to 60 years; Permanent Effects - effects lasting over 60 years.

The likelihood of an impact occurring, and the predicted effects, are also an important consideration in characterizing impacts. The likelihood of an impact occurring is assessed as being certain, likely or unlikely and; in some cases, it may be possible to definitively conclude that an impact will not occur.

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Professional judgement is used in considering the contribution of all relevant criteria in determining the overall magnitude of an impact.

7.2.3.3 Impact Significance

In determining impact significance, the Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009) and the CIEEM Guidelines (CIEEM 2018) were followed, which requires examination of the following two key elements:

- Impact on the integrity of the ecological feature; and,
- Impact on its conservation status within a given geographical area.

7.2.3.3.1 Integrity

The term 'integrity' should be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued (NRA 2009).

The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g., Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Proposed Natural Heritage Areas (pNHAs) / Natural Heritage Areas (NHAs) but can often be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and / or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favorable condition: removing or changing the processes that support the sites' habitats and / or species; affecting the nature, extent, structure and functioning of component habitats and/or, affecting the population size and viability of component species.

7.2.3.3.2 Conservation status

The definitions for conservation status given in the Habitats Directive, in relation to habitats and species, are also used in the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009):

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species, at the appropriate geographical scale; and
- For species, conservation status means the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations, at the appropriate geographical scale.
- An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

After the definitions provided in the Habitats Directive, the conservation status of a habitat is favorable when:

- Its natural range and areas it covers within that range are stable or increasing;

- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and,
- The conservation status of its typical species is favourable as defined below under species.

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The conservation status of a species is favorable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and,
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

According to the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Developments methodology (NRA 2009), if it is determined that the integrity and / or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e., local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is considered to be internationally important. However, an impact may occur at a local level on this internationally important species. In this case, the impact on an internationally important species is considered to be significant at only a local, rather than international level.

7.3 The Receiving Environment

7.3.1 The Zone of Influence

The ZoI, or distance over which a likely significant effect may occur, will differ across the KERs, depending on the predicted impacts and the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present within the environs of the Proposed Development. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Development. In some instances, the ZoI extends beyond the study area e.g., surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream).

The ZoI of the Proposed Development in relation to terrestrial habitats is generally limited to the footprint of the planning proposal, and the immediate *environs* (to take account of shading or other indirect impacts, such as air quality). Hydrogeological / hydrological linkages (e.g., rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

This ZoI is determined by the professional judgement of the hydrogeology specialists as discussed in the Hydrology and Hydrogeology Chapter 6. This is further discussed with reference to specific construction activities in Chapter 5 (Land, Soils and Geology).

The unmitigated ZoI of air quality effects is generally local to the Proposed Development and not greater than a distance of 50m from the boundary, (see Air Quality Chapter 8).

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters,

concentrations and types of pollutants (in this case sediment, hydrocarbons, and heavy metals), volumes of receiving waters and the ecological sensitivity of the receiving waters. In the case of the Proposed Development, this includes the River Suir.

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The ZoI for impacts to aquatic fauna species, such as Freshwater pearl mussel (*Margaritifera margaritifera*) and lamprey species *Lampetra* spp., is limited to those water courses which receive runoff from the application site could drain to during construction and operation.

The ZoI for small mammal species, such as the pygmy shrew *Sorex minutus*, would be expected to be limited to no more than approximately 100m from the Proposed Development boundary due to their small territory sizes and sedentary lifecycle. The ZoI for otters, badgers, stoat, and hedgehogs may extend over greater distances than small mammal and bird species due to their ability to disperse many kilometers from their natal / resting sites. The ZoI of impacts for significant disturbance impacts to badger and otter breeding / resting places may extend as far as approximately 150m from the Proposed Development boundary. This ZoI (i.e., approximately 150m from Proposed Development boundary) for badgers and otters has been defined in accordance with the Guidelines for the Crossing of Watercourses during the Construction of National Road Developments (NRA 2005a) and the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Developments (NRA 2005b) and is considered to be of a precautionary distance.

The ZoI of potential effects to bat roosts would not be expected to exceed approximately 200m in most cases but as effects are dependent on many factors (such as species, roost type, surrounding habitat, commuting routes etc.), this is assessed on a case-by-case basis and the ZoI may increase / decrease from this distance accordingly. Given the large foraging ranges for some species, the ZoI of potential landscape scale impacts, such as habitat loss and severance, could extend for several kilometers from the Proposed Development but the most significant effects are likely to occur within 1km of important roost sites (e.g., maternity roosts). Leisler's bats *Nyctalus leisleri* have been recorded foraging up to 13km from maternity roost sites (Shiel *et al.,* 1999).

The ZoI of the Proposed Development in relation to likely significant effects on most breeding bird species is generally limited to habitat loss within the footprint of the Proposed Development, and disturbance / displacement during construction and disruption in territorial singing due to noise during operation. Disturbance effects may extend several hundred meters from the Proposed Development

The ZoI in relation to indirect impacts to wintering birds could extend up to approximately 300m from the Proposed Development for general construction activities, as many species (such as waterbirds) are highly susceptible to disturbance from loud and unpredictable noise during construction. However, as many estuarine bird species use inland habitat areas at distances from the coast, the ZoI for *ex situ* impacts could extend a considerable distance from the Proposed Development. In the case of the Proposed Development, impacts to wintering birds within this 300m band could affect the use of potential *ex-situ* sites for bird species listed as SCIs of European sites.

Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance (Cutts *et al.,* (2009) and Exploring Behavioral Responses of Shorebirds to Impulsive Noise (Wright *et al.,* (2010). In terms of construction noise, levels below 50dB (decibels) would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e., birds becoming alert and some behavioral changes (e.g., reduced feeding activity), but birds are expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m,

typical noise levels associated with construction activity (British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2008)) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

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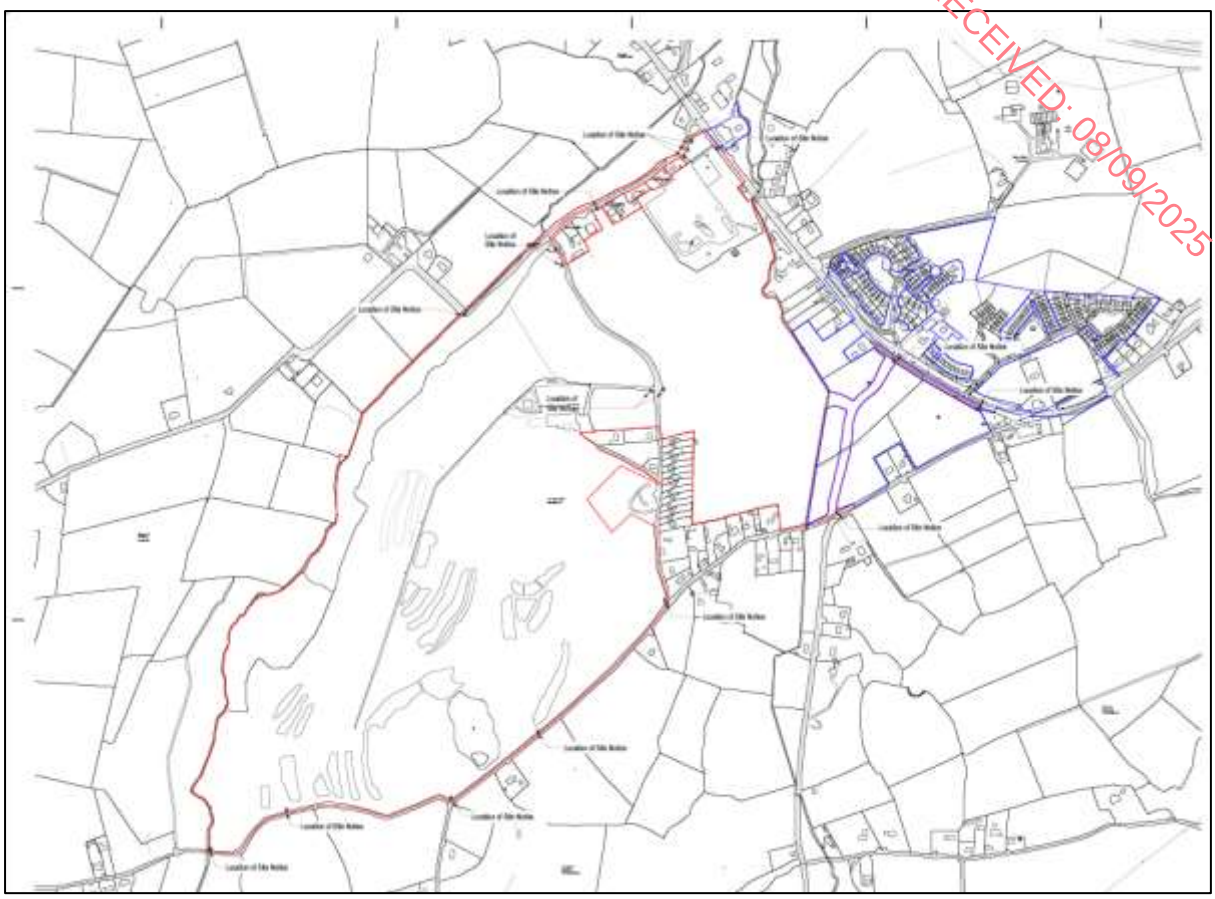
The ZoI in relation to amphibian species is likely to be limited to direct habitat loss and severance within the site boundary and / or indirect impacts to water quality in wetland habitats hydrologically connected to the Proposed Development.

The ZoI in relation to the common lizard is likely to be limited to direct habitat loss and severance within and across the Proposed Development boundary and disturbance / displacement effects in the immediate vicinity during construction.

The potential zone of influence (ZOI) was set at a radius of 15km from the Proposed Project for Natura 2000 sites and to 2km surrounding the site boundary. The potential for the ZOI was influenced by hydrological connections and natural biodiversity corridors e.g. rivers. It is considered that the potential ZOI extends beyond the site outline via the watercourse on site and the Proposed foul and surface water drainage strategy. Works are Proposed on site which could result in silt or petrochemicals entering the onsite watercourse. In addition, although instream works not Proposed. All foul water generated on the Proposed Development will be sent to Ballyduff Lower-Kilmeaden Wastewater Treatment Plant (WWTP) (Reg: A0370), located c. 620m north-east of the site along the Lacka Road. As noted on the Uisce Éireann wastewater capacity register, this plant is noted as having current capacity. A Pre-Connection enquiry application was submitted to Uisce Éireann in December 2024 for the wastewater discharge of the Proposed Development (Ref: DIV24393) (for more detail please refer to Chapter 6 Hydrology and Hydrogeology).

The Proposed Development cannot be considered in isolation. Having regard to this fact, the cumulative environmental impacts of the Proposed Development together with those of other Developments in the region are considered these could have the potential for cumulative or in-combination effects. The application site outline is shown in Figure 7-9.

Figure 7-9 Application site



7.3.1.1 European sites

It is general practice, when screening a plan or project for compliance with the Habitats Directive, to identify all Natura 2000 sites within the functional area of the plan/project itself and within 15 km of the boundaries of the area the plan/project applies to (with an appropriate "Zone of Influence" identified from any Source-Pathway-Receptor linkages). This approach (in combination with OPR (2021) guidelines) is currently recommended in the DoEHLG (2010a) Guidance for Planning Authorities and as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are included in appraisal of KERs.

The maintenance of habitats and species within individual Natura 2000 sites at favorable conservation conditions contributes to the overall maintenance of favorable conservation status of those habitats and species at a national level. It is therefore necessary to identify any potential impacts of the Proposed Development on the conservation status of Natura 2000 sites. The National Parks and Wildlife Service deem that the favorable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, is stable or increasing.
- The ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The National Parks and Wildlife Service deem that the favorable conservation status of a species is achieved when:

- Population data on the species concerned indicate that it is maintaining itself.
- The natural range of the species is neither being reduced, or likely to be reduced in the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

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There are two areas designated as Special Area of Conservation (SAC) sites that are within 15km of the Proposed Development site (see Table 7-5 and Table 7-6). There are two areas designated as Special Protection Area (SPA) sites that are within 15km of the Proposed Development (see Figure 7-10).

Table 7-5 Natura 2000 sites within 15km of the Proposed Development.

Site Code	Site Name	Designation
002137	Lower River Suir	SAC
000671	Tramore Dunes and Backstrand	SAC
004027	Tramore Back Strand Spa	SPA
004193	Mid-Waterford Coast Spa	SPA

Figure 7-10 Location of Special Area of Conservation (SAC) sites within 15 km of the Proposed Development (1:200,000).



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Figure 7-11 Location of Special Protection Area (SPA) sites within 15 km of the Proposed Development (1:200,000)

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7.3.1.2 Summary of Natura 2000 sites potentially impacted upon by the Proposed Development

There are four Natura 2000 sites within 15km of the Proposed Development. There are no Natura 2000 sites within the envelope of the Proposed Development.

A summary of the qualifying interests (QIs)/special conservation interests (SCIs), availability of detailed conservation objectives, general conservation objectives and distance of the Natura 2000 site from the Proposed Development is presented in Table 7-6. A Natura Impact Statement prepared with regard to the proposed development identified that significant potential impacts were only identified on the Lower River Suir SAC.

Table 7-6 Summary of Natura 2000 sites within 15km of the Proposed Development.

Site Code	Site Name	QIS/SCIs	Detailed Conservation Objectives Document	Conservation Objectives (Generic)	Nearest Distance From Proposed Development/ Sensitivities
002137	Lower River Suir Sac	► Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] ► Mediterranean salt meadows (*Juncetalia maritimi*) [1410] ► Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260] ► Hydrophilous tall herb fringe communities of plains and of the mountain to alpine levels [6430] ► Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] ► Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*) [91E0] ► *Taxus baccata* woods of the British Isles [91J0] ► *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	Yes	► To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	► 0.9km north-west

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Site Code	Site Name	QIS/SCIs	Detailed Conservation Objectives Document	Conservation Objectives (Generic)	Nearest Distance From Proposed Development/ Sensitivities
		► *Austropotamobius pallipes* (White-clawed Crayfish) [1092] ► *Petromyzon marinus* (Sea Lamprey) [1095] ► *Lampetra planeri* (Brook Lamprey) [1096] ► *Lampetra fluviatilis* (River Lamprey) [1099] ► Alosa fallax fallax (Twaite Shad) [1103] ► *Salmo salar* (Salmon) [1106] ► *Lutra lutra* (Otter) [1355]			
04193	Mid-Waterford Coast Spa	► Cormorant (*Phalacrocorax carbo*) [A017] ► Peregrine (*Falco peregrinus*) [A103] ► Herring Gull (*Larus argentatus*) [A184] ► Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Yes	► To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.	► 8.6km south
000671	Tramore Dunes And Backstrand Sac	► Mudflats and sandflats not covered by seawater at low tide [1140] ► Annual vegetation of drift lines [1210] ► Perennial vegetation of stony banks [1220] ► Salicornia and other annuals colonising mud and sand [1310] ► Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] ► Mediterranean salt meadows (*Juncetalia maritimi*) [1410] ► Embryonic shifting dunes [2110]	Yes	► To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	► 8.9km south-east

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Site Code	Site Name	QIS/SCIs	Detailed Conservation Objectives Document	Conservation Objectives (Generic)	Nearest Distance From Proposed Development/ Sensitivities
		► Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] ► Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]			
004027	Tramore Back Strand Spa	► Light-bellied Brent Goose (Branta bernicla hrota) [A046] ► Golden Plover (*Pluvialis apricaria*) [A140] ► Grey Plover (*Pluvialis squatarola*) [A141] ► Lapwing (*Vanellus vanellus*) [A142] ► Dunlin (*Calidris alpina*) [A149] ► Black-tailed Godwit (*Limosa limosa*) [A156] ► Bar-tailed Godwit (*Limosa lapponica*) [A157] ► Curlew (*Numenius arquata*) [A160] ► Wetland and Waterbirds [A999]	Yes	► To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. ► To maintain or restore the favourable conservation condition of the wetland habitat at Tramore Back Strand SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.	► 9.05km south-east

7.3.1.3 Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs)

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NHAs are designations under Section 18 of the Wildlife (Amendment) Act 2000 to protect habitats, species or geology of national importance.

In addition to NHAs, pNHAs are sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily Proposed or designated. pNHAs are offered protection in the interim period under the county or city Development plans which requires that planning authorities give due regard to their protection in planning policies and decisions. The Proposed Development lies within the administrative boundaries of the Waterford city and county Development plan 2022-2028.

Many of the pNHA sites, and some of the NHAs in Ireland overlap with the boundaries of European sites.

These pNHAs are valued as being of National Importance. An investigation of the NPWS map viewer revealed that there are no NHAs within the ZoI of the Proposed planning application, there are however several pNHAs.

Table 7-7 NHA and pNHAs located within the ZoI of the Proposed Development Boundary (highlighted in bold), and those in the Wider Area of the Proposed Development Boundary

Site	Site Number
pNHA, Lower River Suir	**000399**
pNHA, Portlaw woods	**000669**
pNHA, Grannyferry	000833
pNHA , Kilbarry Bog	001700
pNHA, Fennor bog	001697
pNHA Carrickavrantry Reservoir	000660
pNHA Ballin Lough	001691

7.3.1.4 Other Designated Sites

Other designations recognized in the Waterford region include a RAMSAR wetlands site, Tramore Backstrand and The Copper Coast UNESCO Global Geopark are considered in terms of the European and National sites assessment, however these were deemed to be outside the ZoI of the planning application. There are no Special Area Amenity Order (SAAO) mentioned in the Waterford City and County Development plan within the ZoI of the planning application site.

Realistically, the Zone of Influence is restricted to the immediate vicinity of the proposed development, with potential for likely significant impacts on the Lower River Suir SAC.

7.3.2 Species data Baseline environment

This section describes the species data gathered onsite and during the desk study. It should be noted that no species of conservation importance were noted on site to date.

Table 7-8 Species of conservation concern recorded in queried grid squares intersecting Blackknock townland in which the Proposed Development is located. BD = Birds

Directive, HD = Habitats Directive, FPO = Flora Protection Order 2015, WA = Wildlife Acts, BOCCI = Birds of Conservation Concern 2020-2026.

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Group	Species	Year Of Last Record	Annex I BD	Annex II HD	Annex IV HD	Annex V HD	FPO	WA	Red List Status	BOCCI
Amphibians	*Common Frog Rana temporaria*	1994				V		WA	LC	
Birds	*Barn Owl Tyto alba*	1991								Red
Birds	*Bar-tailed Godwit Limosa lapponica*	2011	I							Red
Birds	*Black-headed Gull Larus ridibundus*	2011								Amber
Birds	*Black-tailed Godwit Limosa limosa*	2011								Red
Birds	*Brambling Fringilla montifringilla*	2011								Amber
Birds	*Chough Pyrrhocorax pyrrhocorax*	2011	I							Amber
Birds	*Common Gull Larus canus*	2011								Amber
Birds	*Common Sandpiper Actitis hypoleucos*	2011								Amber
Birds	*Common Scoter Melanitta nigra*	1984								Red
Birds	*Coot Fulica atra*	1991								Amber
Birds	*Cormorant Phalacrocorax carbo*	2011								Amber
Birds	*Corncrake Crex crex*	2011	I							Red
Birds	*Curlew Numenius arquata*	2011								Red
Birds	*Dunlin Calidris alpina*	2011								Red
Birds	*Fulmar Fulmarus glacialis*	1991								Amber
Birds	*Gannet Morus bassanus*	1984								Amber
Birds	*Goldcrest Regulus regulus*	2011								Amber
Birds	*Golden Plover Pluvialis apricaria*	2011	I							Red
Birds	*Goldeneye Bucephala clangula*	1984								Red
Birds	*Goosander Mergus merganser*	2011								Amber
Birds	*Great Crested Grebe Podiceps cristatus*	2011								Amber
Birds	*Great Northern Diver Gavia immer*	2011	I							Amber

Group	Species	Year Of Last Record	Annex I BD	Annex II HD	Annex IV HD	Annex V HD	FPO	WA	Red List Status	BOCCI
Birds	*Greenfinch Chloris chloris*	2011								Amber
Birds	*Grey Partridge Perdix perdix*	1972								Red
Birds	*Grey Plover Pluvialis squatarola*	2011								Red
Birds	*Grey Wagtail Motacilla cinerea*	2011								Red
Birds	*Guillemot Uria aalge*	1984								Amber
Birds	*Hen Harrier Circus cyaneus*	2011	I							Amber
Birds	*Herring Gull Larus argentatus*	2011								Amber
Birds	*House Martin Delichon urbicum*	2011								Amber
Birds	*House Sparrow Passer domesticus*	2011								Amber
Birds	*Kestrel Falco tinnunculus*	2011								Red
Birds	*Kingfisher Alcedo atthis*	1972	I							Amber
Birds	*Kittiwake Rissa tridactyla*	2011								Red
Birds	*Knot Calidris canutus*	2011								Red
Birds	*Lapwing Vanellus vanellus*	2011								Red
Birds	*Lesser Black-backed Gull Larus fuscus*	2011								Amber
Birds	*Light-bellied Brent Goose Branta bernicla hrota*	2011								Amber
Birds	*Little Egret Egretta garzetta*	2011	I							Green
Birds	*Little Gull Larus minutus*		I							Amber
Birds	*Long-tailed Duck Clangula hyemalis*	2011								Red
Birds	*Mallard Anas platyrhynchos*	2011								Amber
Birds	*Meadow Pipit Anthus pratensis*	2011								Red
Birds	*Mediterranean Gull Larus melanocephalus*	2011	I							Amber
Birds	*Merlin Falco columbarius*	1984	I							Amber
Birds	*Mute Swan Cygnus olor*	2011								Amber
Birds	*Oystercatcher Haematopus ostralegus*	2011								Red

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Group	Species	Year Of Last Record	Annex I BD	Annex II HD	Annex IV HD	Annex V HD	FPO	WA	Red List Status	BOCCI
Birds	*Pochard Aythya ferina*	2011								Red
Birds	*Razorbill Alca torda*	2011								Red
Birds	*Red-breasted Merganser Mergus serrator*	2011								Amber
Birds	*Redshank Tringa totanus*	2011								Red
Birds	*Red-throated Diver Gavia stellata*	2011	I							Amber
Birds	*Redwing Turdus iliacus*	2011								Red
Birds	*Ringed Plover Charadrius hiaticula*	2011								Amber
Birds	*Sand Martin Riparia riparia*	2011								Amber
Birds	*Scaup Aythya marila*	2011								Red
Birds	*Shag Phalacrocorax aristotelis*	2011								Amber
Birds	*Shelduck Tadorna tadorna*	2011								Amber
Birds	*Skylark Alauda arvensis*	2011								Amber
Birds	*Smew Mergellus albellus*	2011	I							Amber
Birds	*Snipe Gallinago gallinago*	2011								Red
Birds	*Spotted Flycatcher Muscicapa striata*	2011								Amber
Birds	*Spotted Redshank Tringa erythropus*	2011								Amber
Birds	*Starling Sturnus vulgaris*	2011								Amber
Birds	*Stock Dove Columba oenas*	2011								Red
Birds	*Swallow Hirundo rustica*	2011								Amber
Birds	*Swift Apus apus*	2011								Red
Birds	*Teal Anas crecca*	2011								Amber
Birds	*Tufted Duck Aythya fuligula*	2011								Amber
Birds	*Turnstone Arenaria interpres*	2011								Amber
Birds	*Turtle Dove Streptopelia turtur*	1972								Red
Birds	*Whooper Swan Cygnus cygnus*	2011	I							Amber

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Group	Species	Year Of Last Record	Annex I BD	Annex II HD	Annex IV HD	Annex V HD	FPO	WA	Red List Status	BOCCI
Birds	*Willow Warbler Phylloscopus trochilus*	2011								Amber
Birds	*Woodcock Scolopax rusticola*	2011								Red
Birds	*Yellowhammer Emberiza citrinella*	2011								Red
Butterflies (Lepidoptera)	*Dark Green Fritillary Argynnis aglaja*	1984							VU	
Butterflies (Lepidoptera)	*Gatekeeper Pyronia tithonus*	2006							NT	
Butterflies (Lepidoptera)	*Grayling Hipparchia semele*	1975							NT	
Butterflies (Lepidoptera)	*Marsh Fritillary Euphydryas aurinia*	1990		II					VU	
Butterflies (Lepidoptera)	*Small Blue Cupido minimus*	1973							EN	
Butterflies (Lepidoptera)	*Small Heath Coenonympha pamphilus*	2006							NT	
Flowering Plants (Angiosperms)	*Autumn Lady's-tresses Spiranthes spiralis*	1900							NT	
Flowering Plants (Angiosperms)	*Fragrant Agrimony Agrimonia procera*	1997							NT	
Flowering Plants (Angiosperms)	*Green-winged Orchid Orchis morio*	1901							VU	
Flowering Plants (Angiosperms)	*Pale Flax Linum bienne*	1899							NT	
Land and Freshwater Mollusca	*Ash-black Slug Limax cinereoniger*	1940							VU	
Land and Freshwater Mollusca	*Brown Snail Zenobiella subrufescens*	1940							VU	
Land and Freshwater Mollusca	*English Chrysalis Snail Leiostyla anglica*	1858							VU	
Land and Freshwater Mollusca	*Globular Pea Mussel Pisidium hibernicum*	1940							NT	
Land and Freshwater Mollusca	*Heath Snail Helicella itala*	1940							VU	

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Group	Species	Year Of Last Record	Annex I BD	Annex II HD	Annex IV HD	Annex V HD	FPO	WA	Red List Status	BOCCI
Land and Freshwater Mollusca	*Moss Chrysalis Snail Pupilla muscorum*	1940							EN	
Land and Freshwater Mollusca	*Narrow-mouthed Whorl Snail Vertigo angustior*	1940		II					VU	
Land and Freshwater Mollusca	*Plaited Snail Spermodea lamellata*	1940							EN	
Land and Freshwater Mollusca	*Prickly Snail Acanthinula aculeata*	1940							NT	
Land and Freshwater Mollusca	*Striated Whorl Snail Vertigo substriata*	1858							NT	
Land and Freshwater Mollusca	*Swollen Spire Snail Mercuria cf. similis*	1940							EN	
Land and Freshwater Mollusca	*Wall Snail Balea perversa*	1940							VU	
Macro-moths (Lepidoptera)	*Feathered Brindle Aporophyla australis*	1879							VU	
Mammals	*Badger Meles meles*	2004						WA	LC	
Mammals	*Fallow Deer Dama dama*	2008						WA	LC	
Mammals	*Irish/Mountain Hare Lepus timidus*	2011				V		WA	LC	
Mammals	*Soprano Pipistrelle Pipistrellus pygmaeus*	2016			IV			WA	LC	

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Table 7-9 Invasive species recorded in queried grid squares intersecting Blackknock townland in which the Proposed Development is located.

Species	Date Of Last Record	Invasive Designation
Cherry Laurel (Prunus laurocerasus)	2002	High Impact
Curly waterweed (Lagarosiphon major)	1999	Third Schedule | EU Reg. 1143/2014 | High Impact
Field penny-cress (Thlaspi arvense)	2006	Medium Impact
Himalayan honeysuckle (Leycesteria formosa)	2001	Medium Impact
Japanese knotweed (Fallopia japonica)	2008	Third Schedule | High Impact
Parrot's feather (Myriophyllum aquaticum)	1999	Third Schedule | EU Reg. 1143/2014 | High Impact
Sycamore (Acer pseudoplatanus)	2001	Medium Impact

American Mink (Mustela vison)	2008	High Impact
Common Garden Snail (Cornu asperum)	1975	Medium Impact
European rabbit (Oryctolagus cuniculus)	2014	Medium Impact
Fallow Deer (Dama dama)	2008	High Impact
Jenkins's spire snail (Potamopyrgus antipodarum)	1940	Medium Impact
Wrinkled helicellid (Candidula intersecta)	1940	Medium Impact

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Table 7-10 Data from Irish Wetlands database information pertaining to "Blackknock Ponds".

Site Name	BLACKKNOCK PONDS
Site Code	WMI_WD100
County	Waterford
Site Evaluation	F Rating: Unknown value -
Site Protected	No
Main Wetland Type	ARTIFICIAL POND, SCRUB
Description	Constructed wetland ponds with reed swamp and other wetland communities. These constructed wetlands were designed to treat creamery effluent, and provide a series of pools, some of which may be flooded, others of which may have lower levels (providing exposed mud), at any one time.

Table 7-11 Map of Irish Wetlands database information pertaining to "Blackknock Wet Woodland".

Site Name	BLACKKNOCK WET WOODLAND
Site Code	WMI_WD195
County	Waterford
Site Evaluation	C+ Rating: County Conservation value
Site Protected	No
Main Wetland Type	RIVER, WET WOODLAND (OAK ASH OR WILLOW ALDER)
Description	The dominant woodland type is wet willow-alder-ash, with all three of these species present: grey willow (*Salix cinerea*) and alder (*Alnus glutinosa*) in the canopy and ash (*Fraxinus excelsior*) mostly in the understory.

7.3.2.1 Margaritifera sensitive areas

GIS shapefiles of Margaritifera sensitive areas were consulted to identify any river catchments within the vicinity of the Proposed Development in which Freshwater Pearl Mussels (*Margaritifera margaritifera*) have been recorded. The catchment limits are based on sub-basin boundaries from the EPA Water Framework Directive geodatabase (filename: EPA_WFD_v3.mdb), and catchments are divided up into three categories:

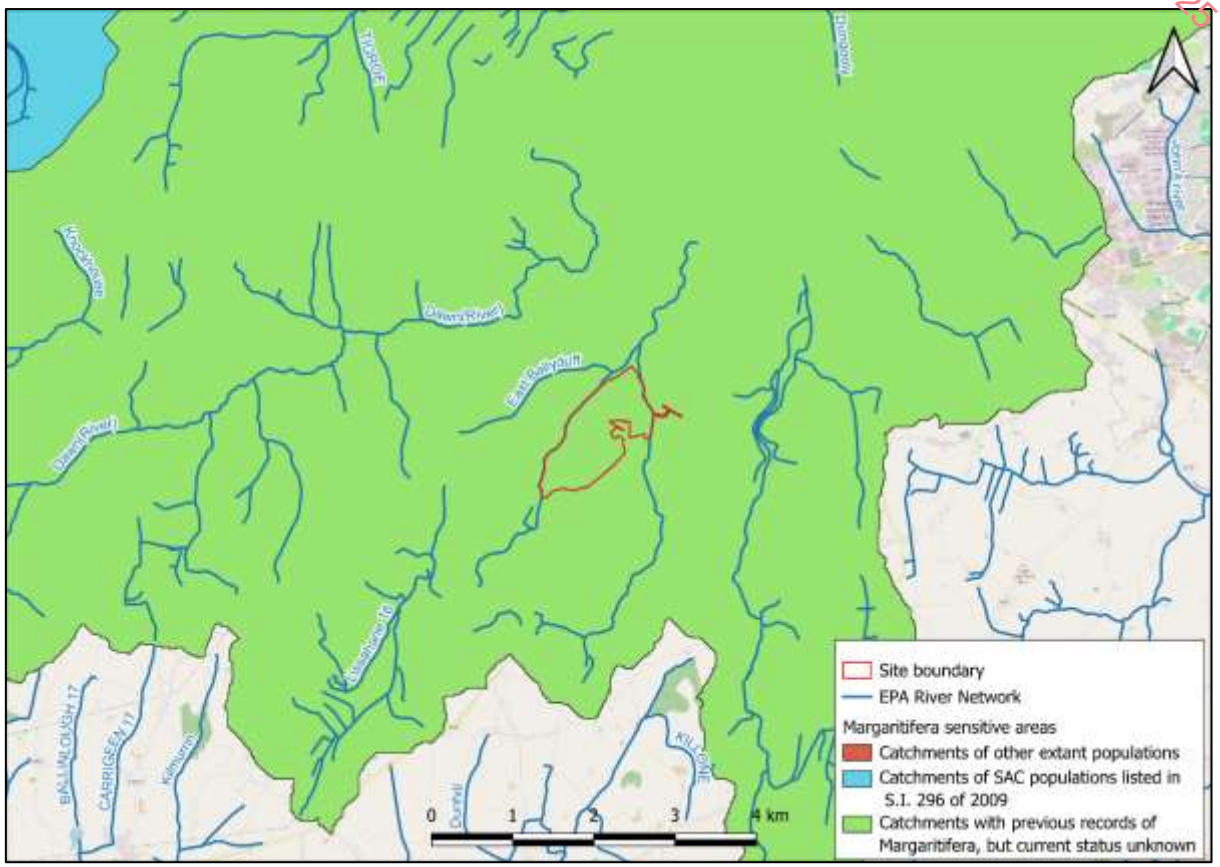
1. Catchments of SAC populations listed in S.I. 296 of 2009
2. Catchments of other extant populations

3. Catchments with previous records of Margaritifera, but current status unknown.

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The Proposed Development is within "Catchments with previous records of Margaritifera, but current status unknown" as illustrated below in Figure 7-12.

Figure 7-12 Fresh water pearl mussel (Margaritifera margaritifera) sensitive areas proximate to the Proposed Development (1:50,000).



7.3.3 I-WeBS data

"Kilmeaden Cream (Blackknock)", Irish grid reference S5108 was surveyed as part of the Irish Wetland Bird Survey (I-WeBS). The I-WeBS national monitoring program, which commenced during the 1994/1995 season is funded by the National Parks and Wildlife Service and coordinated by the I-WeBS Office based at BirdWatch Ireland. I-WeBS monitors coastal wetland sites together with inland lakes, turloughs, rivers and callows. I-WeBS aims to monitor all non-breeding waterbirds in Ireland to provide the principal data on which the conservation of their populations and wetland habitats is based. To this end, I-WeBS has three main objectives (Birdwatch Ireland, 2008):

- to assess the importance of individual sites for waterbirds;
- to assess the size of non-breeding waterbird populations in Ireland;
- to assess trends in their numbers and distribution.

The Waterford Birds (2005) webpage "Site guide: Kilmeaden pools birds" provides background information relevant to the site in relation to its importance to birds. The habitat is described as "constructed wetlands with settling ponds and marsh habitat", with the main interest described as "waterfowl and waders". Regular/annual species listed include Green Sandpiper and Water Rail, while scarcer species and rarities

at the site include Garganey, Hen Harrier, Ruff, Wood Sandpiper, Little Gull and Water Pipit. An excerpt of further details relevant to the site as outlined by Waterford Birds (2005) is reproduced below as follows:

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> *"These constructed wetlands were designed to treat creamery effluent, and provide a series of pools, some of which may be flooded, others of which may have lower levels (providing exposed mud), at any one time. Large numbers of Moorhen are resident, and Water Rails also occur in the marshes. A good mix of dabbling duck (including Shoveler) occurs in winter, and Garganey has occurred as a migrant. Large numbers of Snipe occur in Winter, and Green Sandpiper may occur in almost any month. Passage waders have included Ruff and Wood Sandpiper, and there is potential for rare species. Sedge Warblers breed in the marsh habitat here, and small numbers of Chiffchaffs in Winter. Water Pipits have occurred in Winter 2003/2004 and 2004/2005, up to two birds each winter, and the marsh habitat here seems to be ideal for the species. A few Choughs are occasionally recorded feeding nearby (c.10 km inland)".*

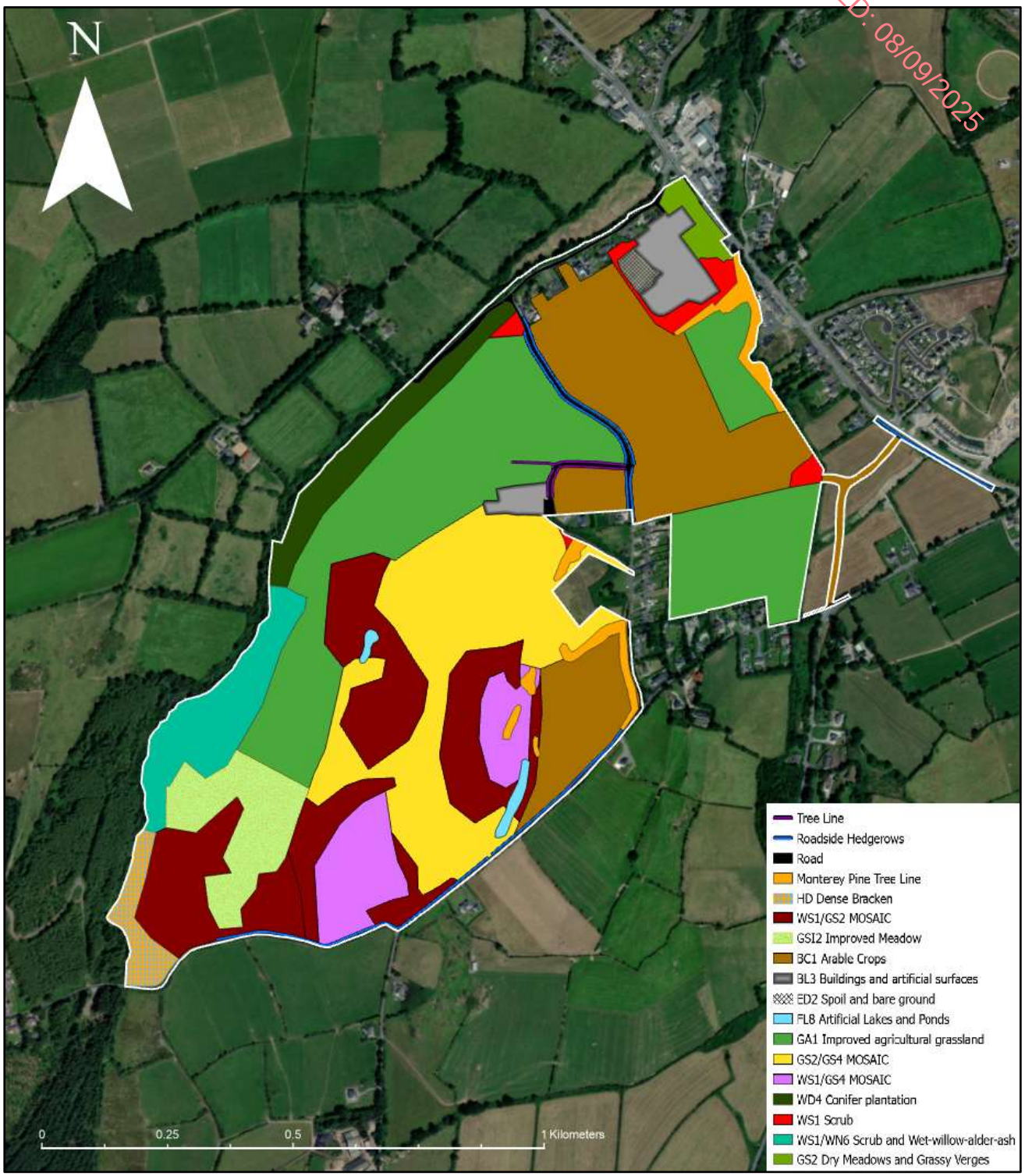
Figure 7-13 Map of Irish Wetlands showing Proposed site boundary relative to proximate wetland sites (1:9,000).



7.3.4 Biodiversity on site

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Figure 7-14 Habitat map of the Proposed Development.



7.3.4.1 Ecological site description

The ecological description of the site is based on walk over surveys during the period September 2024 – June 2025. The location of the site is proximate to Kilmeaden village in Co. Waterford with the site

extending away from the village to the southwest. Figures 13 and 10 show historic and recent satellite imagery.

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Figure 7-15 Historical image of Kilmeaden planning application site (2015).



Figure 7-16 Recent image of the Kilmeaden planning application site (2023).



The fields closest to the village consist of lush agricultural grassland dominated by *Lolium perenne* (probably cut for silage as no animals were observed here during the survey period. Large crop fields also occur which, at the start of survey work on the 3rd of September contained Maize. Harvesting occurred in October. Of note were footprint of deer and deer faeces. It is likely considering the size of the faeces and print that Fallow deer are the most likely deer on site. Fallow deer have been recorded in the 1Km square around the site (NBDC database, see Table 7-9) and consultation with local deer stalkers confirm this. Deer did not trigger any of the camera traps located on site.

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At the most northerly corner of this section of the site the demolished Kilmeaden plant occurs (see

Figure 7-15 and

Figure 7-16). What remains here are large, concreted and tiled areas, levelled rubble piles, tarmac access roads and carpark with bramble scrub and a small area of abandoned lawn. A treeline of Popular (*Populus* sp.) is distinctive on the southeastern boundary of the demolition area. Some pump houses remain within this demolished area (see Figure 7-4). No indications of bat were observed during winter/summer surveys. Many small mammals are likely to utilize the areas of rank, grassy habitat which occur within the demolition area. Hedgehog faeces was identified within the site of the demolished factory. The demolition area also contains significant scrub (WS1) habitat composed of Bramble (*Rubus fruticosa* agg), Grey willow (*Salix cinerea*) and Dawin's barberry (*Berberis darwinii*). This habitat supports a range of small bird species who typically nest in this habitat including Eurasian Robin, Blackcap, Willow Warbler, Chiffchaff and Wren.

Figure 7-17 Satellite imagery of the Kilmeaden factory in 2013 (Map Genie)



Figure 7-18 Satellite imagery of the demolished Kilmeaden factory in 2025 (Google Earth)



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A tributary of Whelan's Bridge River flows parallel to the town along the northeastern boundary (see Figure 7-17). This tributary arises from the Knockaderry Reservoir it converges with the Whelan's Bridge River to the north of the R680. It was deemed possible that this tributary could be used as a foraging corridor by Otter and Kingfisher. A trail camera was deployed along its length to investigate this. Trail camera footage produced did not reveal any evidence of either Kingfisher or Otter. A significant amount of domestic waste was noted in this tributary adjacent to the village playground. Bird species frequenting the tributary included Heron and Mallard. The tributary is flanked by a townland boundary hawthorn hedgerow in parts and by a line of mature Monterey pine. An 'outlier' badger sett (sett consisting of a single entrance used by badger, when necessary, was noted under the Monterey pine treeline (this area will not be impacted upon by the proposed development). Soil disturbance caused by foraging badger was also noted within this treeline. Foraging of grey squirrel was evidenced by an abundance of characteristically eaten pine-cones. The Monterey Pine treeline with an associated Black willow (*Salix nigra*) understory was noted to be important for avian species including Crossbills, Woodpecker and Chiffchaff. The hedgerow marks a townland boundary, but the hedgerow itself is in very poor condition as a consequence of overcutting, general poor management and spraying at the base (for a full assessment of the hedgerows onsite please view Appendix 2). The eastern boundary of the site is adjacent to a local road which runs through the Ballyduff townland and parallel to the R680. An over-managed hedge runs the length of this boundary on both sides of the road, this hedge is characterized by tall (>4m) mature Hawthorn trees (*Crataegus monogyna*) with significant gaps, an overabundance of both Bracken (*Pteridium aquailinum*) and Bramble (*Rubus Fruticosus* agg). This hedgerow occurs on a crumbling dry-stone wall, in places reduced to an embankment. Several species indicative of ancient native woodland and therefore deemed important for hedgerow appraisal (Foulkes et al 2013, HAS) were identified on site including Primrose (*Primula vulgaris*), Bluebell (*Hyacinthoides non-scripta*) and Herb Robert (*Geranium robertianum*). The poor state of the hedgerow system could easily be rectified by alternative management and interventions such as planting into the hedge a range of native tree/shrub species of local provenance.

Figure 7-19 The Whelan's bridge Stream which runs along the northeastern boundary of the site parallel to the village.

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Figure 7-20 Heron pictured in the Whelan's Bridge River tributary. Image captured using a Bushnell trail camera.



Continuing through the site in a south-westerly direction away from those fields designated for the data center and village, a farm track runs through the center of the site and parallel to the Whelan's Bridge

River, this component of the site would contain the solar farm. Along the farm track, Griselinia and Sycamore tree lines are notable and lead to an abandoned farmyard. The treelines were noted to be important for many hedgerow birds including Sparrow, Chaffinch, Great tit Robin, Dunnock and Bluetit. Sloping fields of agricultural grassland fall away to the Western boundary of the site. These fields have been reseeded in recent years and are dominated by *Lolium perenne* (see Figure 7-19).

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The western boundary of the site is characterized by an area of Spruce plantation which runs adjacent to the Whelan's Bridge River. The plantation occurs on a very steep slope the base of which exhibits humus rich waterlogged soils dominated by aquatic vegetation such as Yellow flag iris (*Iris pseudacorus*), Water mint (*Mentha aquatica*), Water cress (*Rorippa nasturtium aquatica*) and Brooklime (*Veronica beccabunga*). Drier areas within the woodland were noted to contain species indicative of ancient woodland including Bugle (*Ajuga reptans*), Bluebells (*Hyacinthoides non-scripta*), and Primrose (*Primula vulgaris*) Great Spotted woodpecker was noted to be calling in these trees on the 15th of January. Similarly, Common Crossbill were seen flying through and from this plantation on two separate occasions in December 2024 and January 2025. Various mammal species utilize this coniferous plantation. Fox were observed within the plantation and were noted running towards it when disturbed whilst hunting in the agricultural fields. Split hazelnut shells were located within the wood, indicating the presence of squirrel (see Figure 7-21).

Figure 7-21 A hazelnut split by a Squirrel



Intensively managed agricultural land of limited ecological value makes up the vast majority of habitat onsite (see

Figure 7-22). Grassland habitat was observed to be grazed by heifers in a rotational manner. Cattle were taken off the land by December 2024, they were returned by the 3rd of April. In agricultural terms, the fields become slightly less productive towards the south of the site being dominated by *Holcus lanatus* (Yorkshire fog) rather than *Lolium perenne* (Perennial ryegrass). These fields have a higher proportion of herb species such as *Achillia millefolium* (Yarrow), *Plantago lanceolata* (Ribwort plantain) and *Lotus*

corniculatus (Bird's foot trefoil) with a greater diversity of grass species such as *Cynosurus cristata* (Crested dog's tail), *Agrostis stolonifera* (Creeping bent) and *Alopecurus pratensis* (Meadow grass). This grassland has been modified through grazing and other agricultural practices to produce improved dry meadow type grassland (GSi2). Common Frog was observed within this habitat (See

Figure 7-23).

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Figure 7-22 Reseeded agricultural grassland (GA1) with Norway spruce plantation in the middle-ground, along the Western boundary



Figure 7-23 Rana temporaria identified onsite



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Within the grasslands found to the West of the farm track are island habitats associated with the previous workings of the site as a repository of milk waste products treated though a series of integrated constructed wetlands. The closure of the Kilmeaden factory and its relocation in Kilkenny has limited the functionality of these 'wetlands'. For the most part these ponds have dried out over the years and have become scrubbed over with a mosaic of willow scrub and wet grassland (see

Figure 7-24). There are just two ponds remaining which contain water permanently (see Figure 7-25). Both ponds will be retained.

The first pond (Pond 1) lies to the southwest of the Blackknock hill immediately adjacent to the farm trackway. The pond is surrounded by *Ulex europaeus* Gorse scrub and improved dry grassland. This first pond (Figure 7-26) is entirely artificial and it categorized as FL8 according to the Fossitt classification system. The habitat was dominated by *Schoenoplectus lacustris* (Common club rush), *Glyceria maxima* (Reed Sweet Grass), *Soft Rush* (Juncus effusus) and Greater Pond sedge (*Carex riparia*). Galingale (*Cyprus longus*) was noted beside this pond, this plant is included in the NBDC Catalogue of Irelands Non-Native Species, however, it has only been recorded once in Ireland at a location in Carrick-on-Suir to the west of the site. One Schedule three species was identified within this pond, New Zealand Pygmyweed (*Crassula helmsii*) (see Figure 7-28). On the 15th of Jan, water from this pond was noted to be flowing further down Blacknock hill into a previously dry pond. Over land flow of water was evident from this previously dry pond across the field and down the slope into the Whelan's bridge River. Propagules of New Zealand pygmy weed could be distributed via this pathway.

In terms of avifauna a variety of species have been noted feeding in this pond including Moorhen, Dab chick, Grey heron and Mallard. A Reed bunting pair were noted to be holding a territory around the pond. The still surface of the pond provides ideal foraging habitat for Daubenton's bat.

A second pond (pond 2) is found to the south east of Blacknock hill (see

Figure 7-27). This pond also falls under the artificial pond category FL8. It is of a similar size to pond 1. Much of the vegetation is similar to that found in Pond 1. It is likely that both ponds are used by *Rana temporaria*, the common frog, however spawn was not observed during surveys in March and April. A second (present on the Third Schedule) aquatic invasive was identified in pond 2, Water fern (*Azolla filiculoides*) (see Figure 7-28).

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A stand of Japanese Knotweed (*Fallopia japonica*) has been noted outside the aquatic habitats. The presence of several plant species listed on Part (1) of the Third Schedule indicates that a comprehensive Alien Invasive Plant Species Management and Control/Eradication Plan should be drawn up and implemented in the pre-construction stage of the proposed development, which will be crucial to preventing any threats to the surrounding environment during and post construction.

Figure 7-24 The constructed wetland system at Kilmeaden (1996).



Figure 7-25 Remaining artificial ponds containing aquatic habitats.

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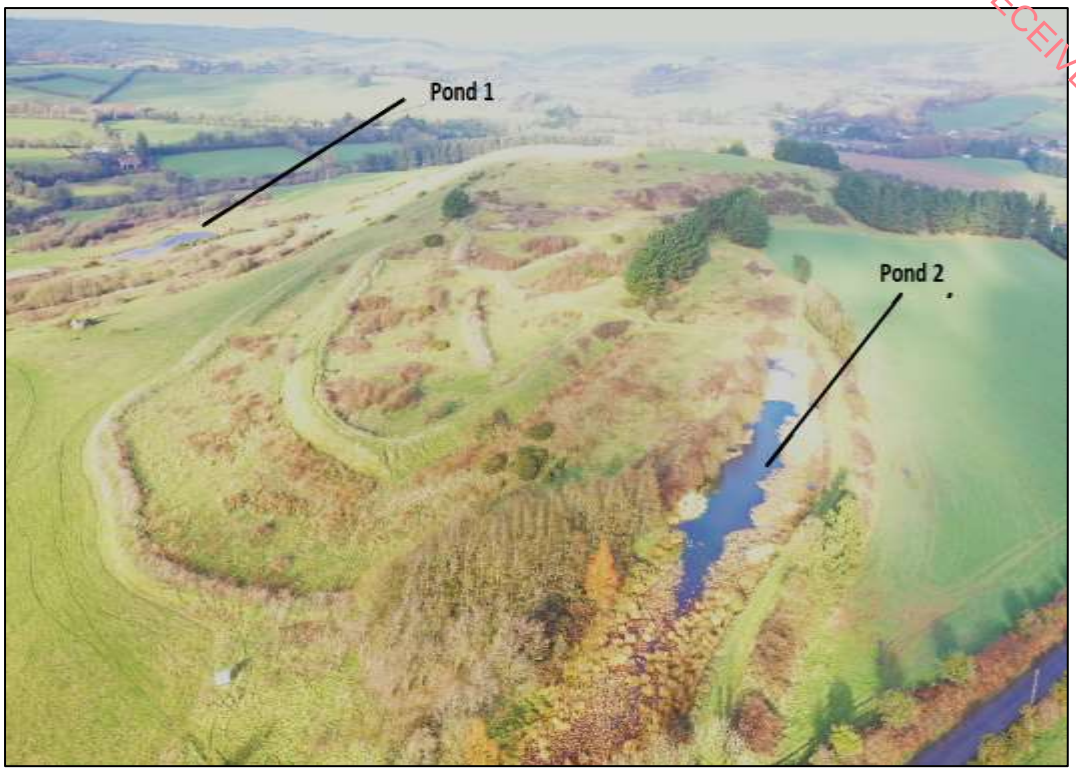


Figure 7-26 Pond 1 to the southwest of Blackknock Hill.



Figure 7-27 Image of Pond 2 to the southeast of Blackknock Hill

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Figure 7-28 Aquatic alien invasive plant species recorded within the ponds. LHS Pigmyweed, RHS Waterfern



There are a variety of grassland habitats onsite which fall into the category of semi improved dry grassland (GSi2) particularly on the mounded soil which once bounded the integrated constructed wetland. Topographically these earthen mounds add structural diversity to the site which enhances biodiversity.

Large swaths of land are entirely dominated by nettles and thistles, particularly around the abandoned farm buildings. These habitats provide suitable habitat for a number of invertebrate species.

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The old settlement ponds present on the south and east of the site were dry during the initial surveys. While these ponds may refill following severe inundation, anecdotal local knowledge suggests that these areas have been dry for some years. They contain a flora which in some areas contains elements of wet grassland, dominated by *Juncus effusus* (Soft rush), *Juncus conglomeratus* (Conglomerate rush) and various sedges (*Carex rostrata, C. hirta, C.nigra*). Scrubbing over of these old settlement ponds is evident with Goat Willow (*Salix caprea*) being the dominant tree.

The presence of outcropping rock on the western side of Blacknock hill was noted during initial surveys, occurring sporadically throughout what is largely semi-improved dry grassland .

Figure 7-29 Outcropping rock.



The Spruce plantation ends abruptly along the western boundary and the Whelan's Bridge River.

Where the plantation ends a native woodland of Willow and Alder is present (Figure 7-30 and

Figure 7-31). The woodland occurs in a steep sloped valley through which the River runs. It is approximately 7 acres in size. It is largely a wet Willow and Alder woodland (WN6) although there are patches of Oak, Ash and Hazel (WN2) along raised banks by the river's edge. This area of woodland was investigated during the National Survey of Native Woodlands on the 27/09/2007 (see Figure 7-32). .Assessment of the woodland (see Figure 7-14) indicates that there have been no immediately apparent changes to its status, but this will have to be verified by surveys during the growing season (see

methodology). Sparrowhawk, Mistle and Song thrush and Jay are noteworthy avian species observed to inhabit this woodland. This woodland habitat will be retained.

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Figure 7-30 The Willow Alder woodland highlighted in muted pink (WN6).

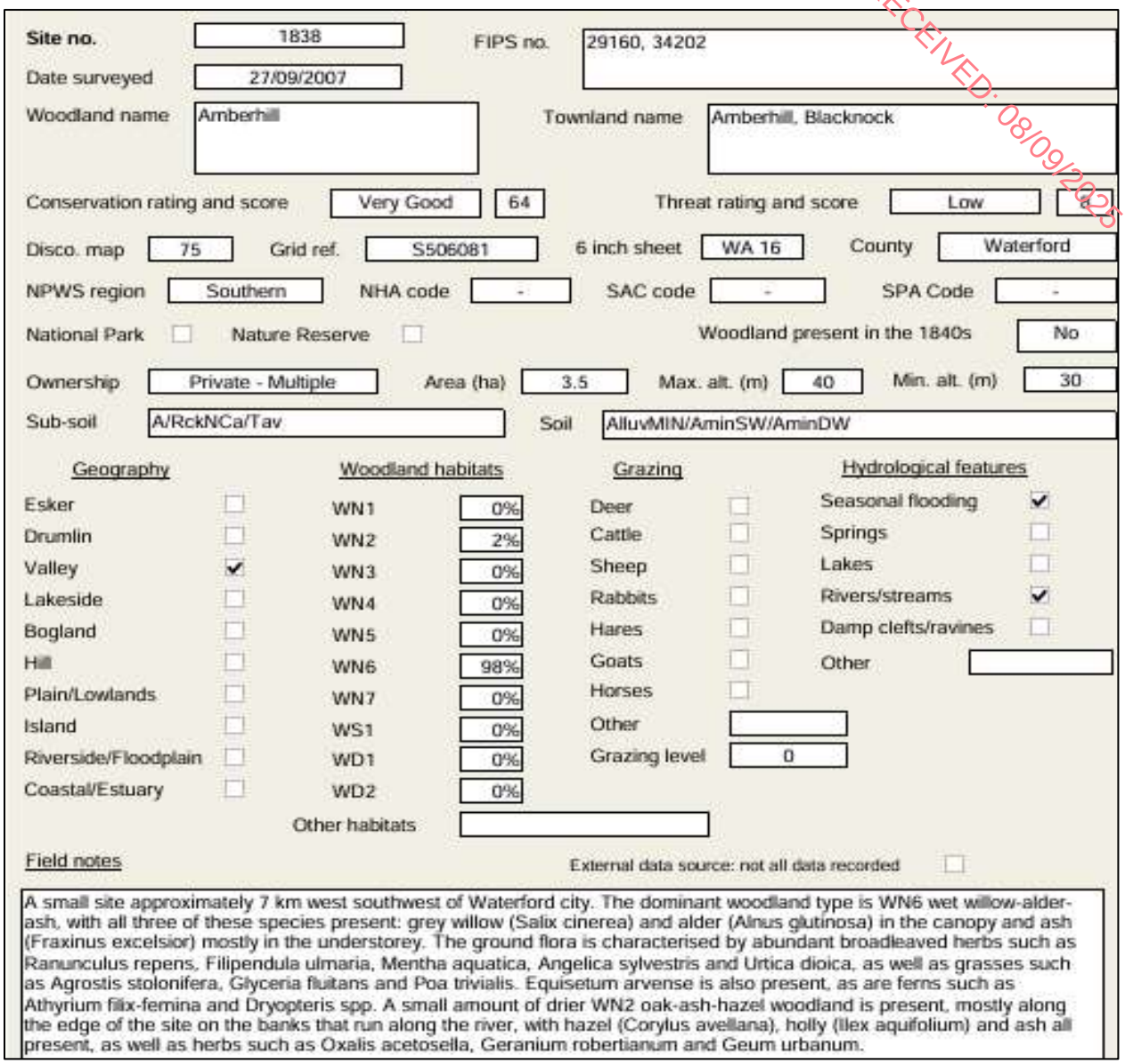


Figure 7-31 Wet Willow and Alder woodland (WN6)



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Figure 7-32 An assessment of the native wood at Amberhill by BEC consultants



Site no. 1838 FIPS no. 29160, 34202
Date surveyed 27/09/2007
Woodland name Amberhill Townland name Amberhill, Blacknock
Conservation rating and score Very Good 64 Threat rating and score Low
Disco. map 75 Grid ref. S506081 6 inch sheet WA 16 County Waterford
NPWS region Southern NHA code - SAC code - SPA Code -
National Park ☐ Nature Reserve ☐ Woodland present in the 1840s No
Ownership Private - Multiple Area (ha) 3.5 Max. alt. (m) 40 Min. alt. (m) 30
Sub-soil A/RckNCa/Tav Soil AlluvMIN/AminSW/AminDW

Geography		Woodland habitats		Grazing		Hydrological features	
Esker	☐	WN1	0%	Deer	☐	Seasonal flooding	☑
Drumlin	☐	WN2	2%	Cattle	☐	Springs	☐
Valley	☑	WN3	0%	Sheep	☐	Lakes	☐
Lakeside	☐	WN4	0%	Rabbits	☐	Rivers/streams	☑
Bogland	☐	WN5	0%	Hares	☐	Damp clefts/ravines	☐
Hill	☐	WN6	98%	Goats	☐	Other	
Plain/Lowlands	☐	WN7	0%	Horses	☐		
Island	☐	WS1	0%	Other			
Riverside/Floodplain	☐	WD1	0%	Grazing level	0		
Coastal/Estuary	☐	WD2	0%				
		Other habitats					

Field notes External data source: not all data recorded ☐

A small site approximately 7 km west southwest of Waterford city. The dominant woodland type is WN6 wet willow-alder-ash, with all three of these species present: grey willow (Salix cinerea) and alder (Alnus glutinosa) in the canopy and ash (Fraxinus excelsior) mostly in the understorey. The ground flora is characterised by abundant broadleaved herbs such as Ranunculus repens, Filipendula ulmaria, Mentha aquatica, Angelica sylvestris and Urtica dioica, as well as grasses such as Agrostis stolonifera, Glyceria fluitans and Poa trivialis. Equisetum arvense is also present, as are ferns such as Athyrium filix-femina and Dryopteris spp. A small amount of drier WN2 oak-ash-hazel woodland is present, mostly along the edge of the site on the banks that run along the river, with hazel (Corylus avellana), holly (Ilex aquifolium) and ash all present, as well as herbs such as Oxalis acetosella, Geranium robertianum and Geum urbanum.

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The Whelan's Bridge River forms the western boundary of a portion of the site (see Figure 7-33). The section of the river which runs by the site is best considered as eroding, the gradient is reasonably steep, and the waters are fast and clear. The bed of this River is characterized by exposed bedrock in some parts and the unstable rocky channel does not support much vegetation. Surveys using camera traps (trail cameras) revealed the River to be a well-used ecological corridor with Fox, Stoat and Pine marten being filmed in this location (see Figure 7-34). Suspected Otter prints were also located along the banks of the River, but targeted surveys recorded no indications of Otter recorded. The clarity of the water was allowed visual observation of the river bed. During surveys there was no observation of Freshwater Pearl Mussel, White-clawed Crayfish or Lamprey. Although Lamprey species were not observed during the survey period, both River and Brook lamprey were identified within this river in 2006 (Irish Wildlife Manual, No26).

Figure 7-33 The Whelan's Bridge River flowing through a wet woodland

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Figure 7-34 Images of Fox (LHS) and Pine Marten (RHS) taken by the river on trail cameras.



Ulex europaeus (Gorse scrub) (WS1) occurs though out the site, this is particularly important for nesting birds and overall cover for birds and mammals. It is most prevalent on the western side of Blackknock Hill where it occurs in agricultural grassland on the steep slopes of the hill. Several pairs of Stonechat were observed to hold breeding territories in this habitat. A smaller gorse population occurs next to the local road to the south of the site. A small area to the North of Blackknock Hill adjacent to residential premises also is dominated by Gorse but with a significant population of *Pteridium aquilinum* (Bracken). Similarly, Bracken is found on the slopes flanking the Whelan's bridge stream to the southwest of the site, in this region however, Dense Bracken (HD1) is the dominant habitat with a lesser quantity of Gorse/Hawthorn scrub.

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Despite the size of the site there are very few hedgerows present. Field boundaries are largely of electric fencing. Of the six major hedgerows identified five were associated with the road running from the north of the site to the south, parallel to the R680. The remaining hedge was associated with the tributary of the Whelan's Bridge River. The longest hedge occurs along the same road to the south of the proposed solar farm. This hedgerow occurs on and adjacent to a dry-stone wall which demarcates the southern boundary of the site. This habitat provides an ecological corridor onsite evidenced by mammal tracks and trails along its length (see

Figure 7-35). Overall, the hedgerows on site show poor management with overcutting using flail, many exhibit spraying at the base and rubbish.

The Whelan's bridge structure over the river itself at the south of the site has been pointed out a potentially sensitive area by Marina Mulligan, Waterford County Council Biodiversity Officer, regarding the presence of bats. There was no indication during bat surveys that the bridge is a significant roosting site. Monitoring of this feature regarding bats should be a component of monitoring during and post-construction.

Figure 7-35 Stoat print.



7.4 Characteristics of the Proposed Development

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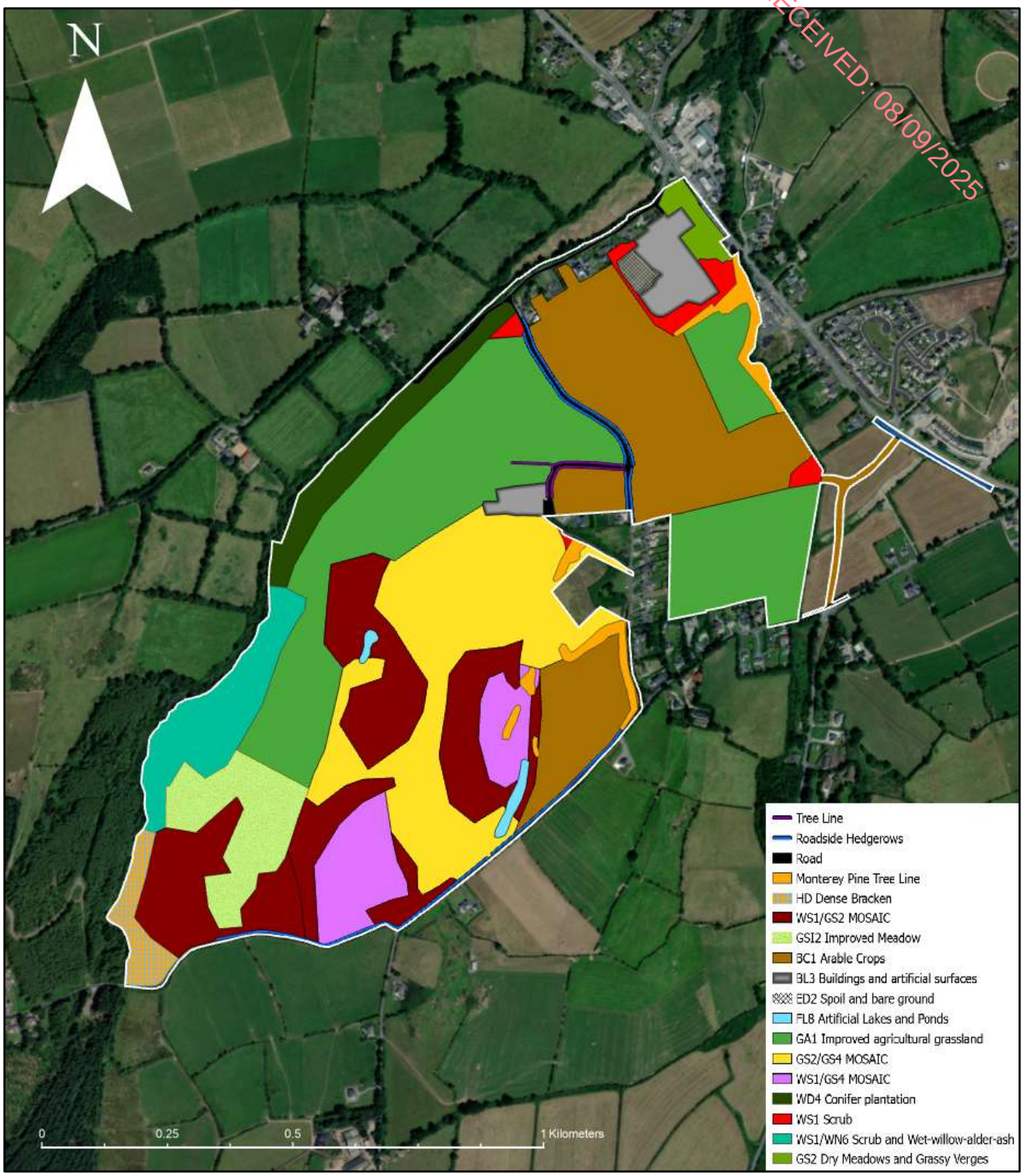
7.4.1.1 Onsite habitats

The results of the habitat surveys within the footprint of the Proposed Development are described below by habitat type (Fossitt 2000). The habitats described below relate to habitat areas within or adjacent to the application site, as shown in Figure 7-36. The habitat types recorded within the footprint of the application site are as follows:

Table 7-12 Habitat types recorded on site.

Fossitt Code	Habitat type
BL1	Stone walls and other stonework
BL3	Buildings and artificial surfaces
BC1	Arable Crops
ED2	Demolition waste, spoil and bare ground
FW2	Depositing / lowland rivers
GA1	Amenity Grassland (Improved)
GS2	Dry meadows and grassy verges
GS4	Wet grassland
WN6	Wet woodland
WL1	Hedgerows
WL2	Tree lines
WS1	Scrub
WD4	Conifer Plantation
FL8	Artificial Ponds and Lankes Pond
HD	Dense Bracken

Figure 7-36 Habitat map of the Proposed Development.



7.4.1.2 Habitats and species occurring

None of the habitats identified onsite correspond to Annex I habitats.

This includes Dry meadows and grassy verges habitat (GS2), which in certain situations corresponds to Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510). The species and management of the habitat within the application site is not analogous to the Annex I hay meadow habitat being managed for grazing purposes.

There are onsite several habitats which are of ecological value locally.

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7.4.1.3 Rare and Protected Plant Species

There were no protected plant species listed on the Flora Protection Order (2022), identified within the footprint of the Proposed Development during field surveys.

The desk study returned 4 species listed on the Flora Protection Order within the 10Km square area (i.e. grid squares S50E and S50D) these are listed in Appendix 2.

7.4.1.4 Otter

Otter, and their breeding and resting places, are legally protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the Habitats Directive. Suspected Otter footprints were discovered on the banks of the Whelan's Bridge River, but targeted Otter surveys did not indicate any otter presence through spraint, holts, couch sites, etc. It is possible that the habitat is utilised on an irregular basis by foraging Otter.

In an Irish context, the conservation concern of otter is 'Least Concern' (Marnell et al. 2019) due to population recoveries since 2009. However, otter remains 'Near Threatened' in a European and Global context (Roos et al., 2015) and is listed on Annex II and Annex IV of the Habitats Directive.

7.4.1.5 Other non-volant Mammal Species

Other mammal species were recorded during the surveys carried out the application site included:

- Stoat
- Pine Marten
- Grey Squirrel
- Hare
- Wood mouse
- Hedgehog
- Badger

The local populations of these other mammal species are deemed to be of Local Importance (Moderate Value) due to the known presence of resident populations within the wider environment of the application site and the fact that they are Wildlife Acts protected species.

Badger, and their breeding and resting places, are legally protected under the Wildlife Acts. Footprints of badger (See Figure 7-37) and evidence of badger foraging activity was recorded within several habitats of the application site, during the walk over surveys undertaken. A potential outlier sett was identified on the Northeastern boundary adjacent to the Whelan's Bridge River Tributary. This potential outlier sett will not be impacted upon by the proposed development.

Although no active setts were encountered, the local badger population is deemed to be of Local Importance (Moderate Value) due to the known presence of resident populations within the wider

environment of the Proposed Development, which are valued as being of local importance as they are a Wildlife Acts protected species.

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Figure 7-37 Badger print



7.4.1.6 Bats

A potential roost assessment of the habitats occurring indicated that several disused buildings had low potential to serve as roosting sites. The Bridges over the Whelan's Bridge River (North and South) are both Grade (1) as regards bat roost potential (crevices possibly of use to bats: These are bridges which have small and a limited number of crevices which may be sub-optimal, perhaps due to dampness or localized disturbance. The possibility that bats could use these crevices cannot be entirely ruled out but is regarded to be low). Any over-mature and/or ivy covered tree must be considered to be a potential bat roost, but these features, where they occur, will be retained on site and unaffected by the proposed development.

An assessment of the use of old buildings as a winter roosting site was undertaken during the period December 2024/January 2025. No bat activity was recorded, indicating that the structures are not utilised as winter roosting habitat.

An assessment of bat activity undertaken in May and June 2025 identified that the following species occur:

- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle;
- Leisler's Bat;
- Natterer's Bat;
- Whiskered Bat;
- Daubenton's Bat; and

- Brown Long-eared Bat

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The vast majority of bat activity is comprised of Common pipistrelle, Soprano pipistrelle and Leisler's Bat, which are ubiquitous in Ireland, given suitable habitat. Bat activity was highest in the vicinity of Ponds 1 and 2 and along the foraging/commuting corridor associated with the Whelan's Bridge River. The timing of activity indicated that there are no significant bat roosts occurring in the immediate vicinity of the application footprint.

In order to verify these findings, an emergence and dawn survey were conducted on the night/morning of the 6th/7th of June 2025. These surveys, in agreement with the activity surveys, indicated that there were no roosts in the vicinity of the application footprint and that the primary species occurring are Common pipistrelle, Soprano pipistrelle and Leisler's Bat.

Table 7-13 Bat activity observed during emergence/dusk and dawn surveys

Recording time	Dusk or Dawn	Location	Species	Activity
10:33	Dusk	Road south of site	Common pipistrelle	Feeding and commuting along hedge/wall structure
10:40	Dusk	Pond 2	Common pipistrelle Soprano pipistrelle	Both feeding at the pond
10:50	Dusk	Arable field	Leisler's bat	Commuting overhead
10:55	Dusk	Arable field	Common pipistrelle	Commuting overhead
11:10	Dusk	Farm path	Soprano pipistrelle	Commuting overhead
11:19	Dusk	Pond 1	Soprano pipistrelle	Feeding at pond 1
11:20	Dusk	Pond 1	Soprano pipistrelle	Feeding at pond 1
3:58	Dawn	Pond 2	Soprano pipistrelle	Feeding at pond 2
4:00	Dawn	Road South of site	Leisler's bat	Commuting overhead
4:15	Dawn	North bridge	Two common pipistrelle	Commuting overhead
4:42	Dawn	Near Pond 2	Soprano pipistrelle	Commuting overhead

There are no significant bat roosts occurring within the application footprint/immediately adjacent. Based on the comprehensive surveys undertaken, no application for a Derogation Licence is required.

7.4.1.7 Birds

64 species of Bird were identified onsite during the entire survey period (Table 7-14). Wren and Blackbird were the most abundant species found during all survey periods.

Table 7-14 Species list of all 64 species identified onsite during from September 2024 to June 2025. Method of identification, BoCCI conservation status and the species'

interaction with the site is also tabulated (SMM is Passive Acoustic Monitor Song MicroMeter)

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Common name	Scientific name	Recording Method	Activity on site	BoCCI
Black headed gull	*Larus ridibundus*	Visual	Commuting over site	Amber
Blackbird	*Turdus merula*	Visual, SMM	Holding territory	Green
Blackcap	*Sylvia atricapilla*	Visual, SMM	Holding territory	Green
Blue tit	*Cyanistes caeruleus*	Visual, SMM	Holding territory	Green
Bullfinch	*Pyrrhulla Pyrrhulla*	Visual, SMM	Holding territory	Green
Buzzard	*Buteo buteo*	Visual, SMM	Hunting, Holding territory	Green
Chaffinch	*Fringilla coelebs*	Visual, SMM	Holding territory	Green
Chiffchaff	*phylloscopus collybita*	Visual, SMM	Holding territory	Green
Coal tit	*Periparus ater*	Visual, SMM	Holding territory	Green
Collard dove	*Streptopelia decaocto*	Visual, SMM	Holding territory	Green
Common crossbill	*Loxia curvirostra*	Visual	Holding territory	Green
Curlew	*Numenius arquata*	SMM	Over wintering	Red
Dab chick	*Tachybaptus ruficollis*	Visual	Holding territory	Green
Dunnock	*Prunella modularis*	Visual, SMM	Holding territory	Green
Feral pigeon	*Columba livia f. domestica*	Visual, SMM	Holding territory	Green
Fieldfare	*Turdus pilaris*	Visual, SMM	Over wintering	Green
Goldcrest	*Regulus regulus*	Visual, SMM	Holding territory	Green
Goldfinch	*Carduelis carduelis*	Visual	Holding territory	Green
Grasshopper warbler	*Locustella naevia*	Visual	Holding territory	Green
Great spotted woodpecker	*Dendrocopus major*	Visual	Holding territory	Green
Great tit	*Parus major*	Visual, SMM	Holding territory	Green
Greenfinch	*Chloris chloris*	Visual	Holding territory	Green
Grey wagtail	*Motacilla cinerea*	Visual, SMM	Holding territory	Green
Hen harrier	*Circus cyaneus*	Visual	Hunting over the site	Red
Herring gull	*Larus agentatus*	Visual	Commuting over site	Amber
Hooded crow	*Corvus cornix*	Visual, SMM	Holding territory, commuting over site	Green
House martin	*Delichon urbicum*	Visual	Feeding over site	Amber
House sparrow	*Passer domesticus*	Visual	Holding territory	Amber
Jackdaw	*Coloeus monedula*	Visual, SMM	Holding territory, commuting over site	Green
Jay	*Garrulus glandarius*	Visual	Holding territory	Green
Kestrel	*Falco tinnunculus*	Visual	Holding territory, hunting on site	Red
Kingfisher	*Alcedo atthis*	SMM	Commuting over site	Amber
Linnet	*Linaria cannabina*	Visual	Holding territory	Amber
Long eared owl	*Asio otus*	Visual	Hunting onsite	Green
Long tailed tit	*Aegithalus caudatus*	Visual	Holding territory	Green
Magpie	*Pica pica*	Visual, SMM	Holding territory	Green
Mallard	*Anas platyrhychos*	Visual, SMM	Holding territory	Green
Meadow pipit	*Anthus pratensis*	Visual, SMM	Holding territory	Red
Mistle thrush	*Turdu viscivorus*	Visual, SMM	Holding territory	Green
Moorhen	*Gallinula chloropus*	Visual, SMM	Holding territory	Green
Pheasant	*Phasianus colchicus*	Visual, SMM	Holding territory	Green
Pied wagtail	*Motacilla alba yarrellii*	Visual, SMM	Holding territory	Green
Raven	*Corvus corax*	Visual	Holding territory, commuting over the site	Green
Redpoll	*Acanthis flammea*	Visual	Holding territory	Green
Redwing	*Turdus iliacus*	Visual, SMM	Overwintering	Red
Reed bunting	*Emberiza schoeniclus*	Visual	Holding territory	Green
Robin	*Erithacus rubecula*	Visual, SMM	Holding territory	Green
Rook	*Corvus frugilegus*	Visual, SMM	Holding territory, commuting over the site	Green
Sedge warbler	*Acrocephalus schoenobaenus*	Visual	Holding territory	Green
Skylark	*Alauda arvensis*	Visual, SMM	Holding territory	Amber
Snipe	*Gallinago gallinago*	Visual	Holding territory	Red
Song thrush	*Turdus philomelos*	Visual, SMM	Holding territory	Green
Sparrowhawk	*Accipiter nisus*	Visual	Holding territory, hunting onsite	Green
Starling	*Sturnus vulgaris*	Visual, SMM	Feeding onsite	Amber
Stock Dove	*Columba Oenas*	Visual, SMM	Holding territory	Red
Stonechat	*Saxicola rubicola*	Visual, SMM	Holding territory	Green
Swallow	*Hirundo rustica*	Visual, SMM	Feeding onsite	Amber
Teal	*Anas crecca*	Visual	Commuting over the site	Amber
Tree sparrow	*Passer montanus*	Visual	Holding territory	Amber
Treecreeper	*Certhia familiaris*	Visual	Holding territory	Green
White throat	*Sylvia communis*	Visual	Holding territory	Green
Willow warbler	*Phylloscopus trochilus*	Visual, SMM	Holding territory	Amber
Woodpigeon	*Columba palumbus*	Visual, SMM	Holding territory	Green
Wren	*Troglodytes troglodytes*	Visual, SMM	Holding territory	Green

7.4.1.7.1 Breeding Birds

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Breeding birds were assessed during March, April, May and June 2025. The results of the initial breeding bird surveys conducted using acoustic analysis indicate the presence of Kingfisher and Curlew (Figures 36 and 37 respectively). Breeding wader and general breeding bird surveys subsequentially indicated that these species are not breeding on site and were recorded commuting over the site. There was no suitable Kingfisher nesting habitat observed on site. There is suitable habitat at the south of the site for breeding Curlew, however, on no occasion were they observed visually holding a territory, breeding/nesting at or near the site. Of the migratory breeding birds observed, Chiffchaff (returning from the Mediterranean) were the first to be encountered during the March survey. Blackcaps (returning from central Europe), Grasshopper warbler (returning from West Africa), Swallow (South Africa), Whitethroat (southern and central Africa), House martin (African tropics), Sedge warbler (western and southern Africa) and Willow warbler (central and southern Africa) were recorded during the May surveys.

Great spotted woodpecker are colonists of broadleaf woodland arriving in Ireland in 2005. These birds are gradually expanding their Irish range. Those seen onsite are resident to the area being identified onsite during the winter and during the breeding season. Figure 40 shows the nest site identified during the 2025 breeding season.

Figure 7-38 A sonogram of Kingfisher recorded at the Kilmeaden site, during the start of the breeding season

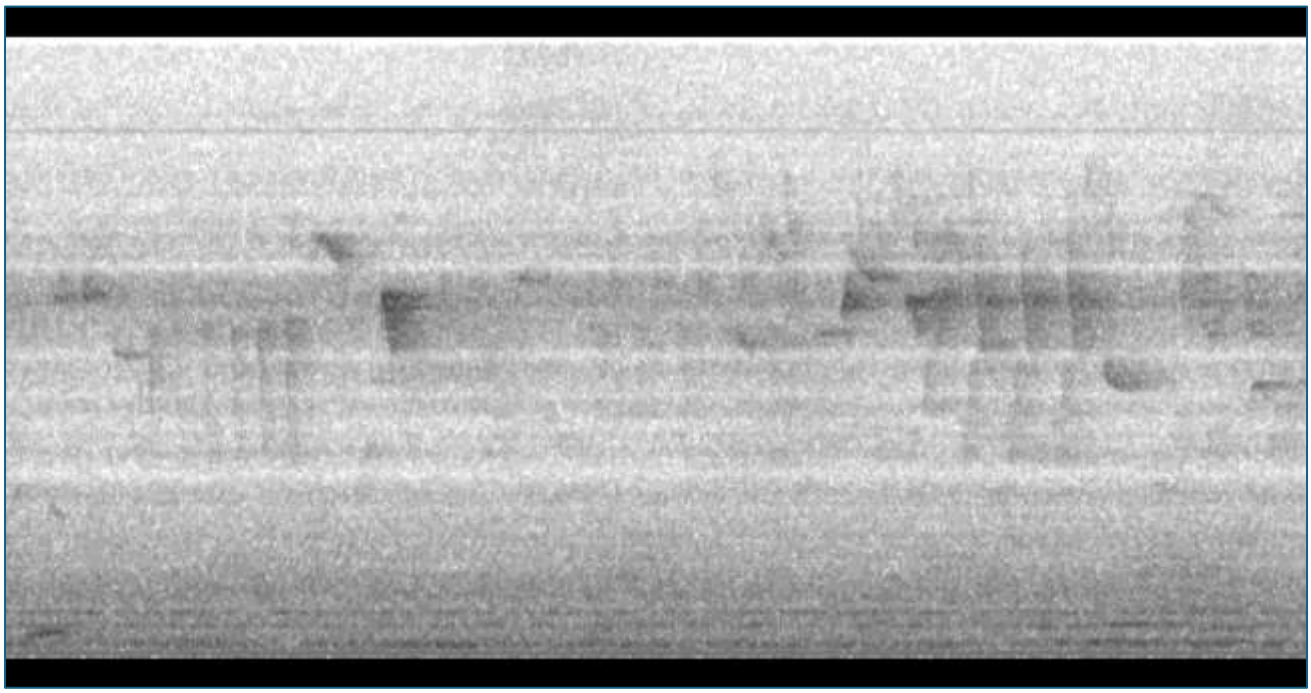


Figure 7-39 A sonogram of Curlew recorded at the Kilmeaden site, during the start of the breeding season

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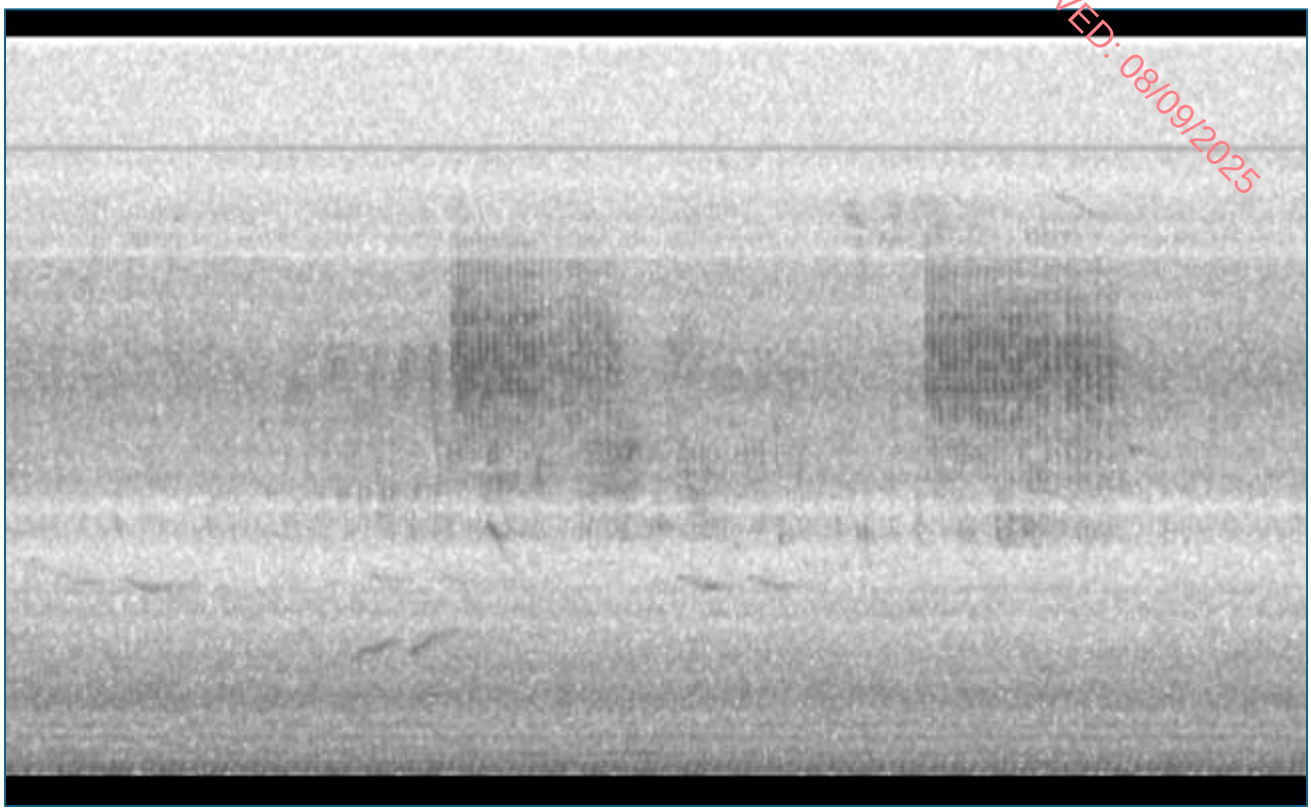


Figure 7-40 Great Spotted Woodpecker nest located in a Grey Willow growing in the Whelan's Bridge River.

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7.4.1.7.2 Winter birds

Of note, at no point during extensive winter bird surveys (undertaken to coincide with high tide, low tide and post-sunset each month) were populations of any Qualifying Interests of proximate SPAs observed to be utilizing the habitats occurring within the application footprint as an *ex situ* foraging or roosting site.

Table 7-15 Species observed onsite over 21 survey periods.

Common name	Scientific name
Blackbird	*Turdus turdus*
Blue tit	*Cyanistes caereulus*
Bullfinch	*Pyrrhula pyhrrula*
Buzzard	*Buteo buteo*
Chaffinch	*Fringilla coelebs*
Chiffchaff	*Phylloscopus collybita*
Coal tit	*Periparus ater*
Collard dove	*Streptopelia decaocto*
Crossbill	*Loxia curvirostra*
Dab chick	*Tachybaptus ruficollis*

Common name	Scientific name
Dunnock	*Prunella modularis*
Fieldfare	*Turdus pilaris*
Gold crest	*Regulus regulus*
Gold finch	*Carduelis cardeulis*
Great spotted woodpecker	*Dendrocopos major*
Great tit	*Parus major*
Green finch	*Chloris chloris*
Grey wagtail	*Motacilla cinerea*
Herring gull	*Larus argentatus*
Hooded crow	*Corvus cornix*
House martin	*Delichon urbicum*
House sparrow	*Passer domesticus*
Jackdaw	*Coloeus monedula*
Jay	*Garrulus glandarius*
Kestrel	*Falco tinnunculus*
Lark	*Alauda arvensis*
Linnet	*Linaria cannabina*
Long tailed tit	*Aegithalos caudatus*
Magpie	*Pica pica*
Mallard	*Anas platyrhynchos*
Meadow pipit	*Anthus pratensis*
Mistle Thrush	*Turdus viscivorous*
Moorhen	*Gallinula chloropus*
Pheasant	*Phasianus colchicus*
Pied wagtail	*Motacilla alba*
Redwing	*Turdus iliacus*
Robin	*Erithacus rubecula*
Rook	*Corvus frugilegus*
Snipe	*Gallinago gallinago*
Song Thrush,	*Turdus philomelos*
Sparrow hawk	*Accipiter nisus*
Starling	*Sturnus vulgaris*
Stock dove	*Columba oenas*
Stonechat	*Saxicola rubicola*
Swallow	*Hirundo rustica*
Tree creeper	*Certhia familiaris*
Wood pigeon	*Columba palumbus*
Wren	*Troglodytes troglodytes*

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7.4.1.8 Reptiles

Common lizards are legally protected under the Wildlife Acts. No reptile species were recorded during the surveys Lizards are not recorded within the 10Km grid square of the Development site.

This species is strongly associated with heathland and coastal dune habitats; neither habitat types were identified within the Proposed Development boundary (Marnell 2002; Farren et al., 2010).

7.4.1.9 Amphibians

The common frog (*Rana temporaria*) and the smooth newt (*Lissotriton vulgaris*) are legally protected under the Wildlife Acts. No evidence of smooth newt was identified within the application site during the multi-disciplinary surveys, however they are recorded in the 10Km grid square in which the application site is located. Frogs were identified onsite on several occasions during walk over surveys.

Suitable amphibian habitat (i.e., vegetated riverbanks, surface water / drainage features with stagnant, relatively unpolluted water) was identified within the footprint of, or adjacent to, the Proposed Development are present but will not be impacted upon.

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Amphibians are deemed to be of Local Importance (Lower Value).

7.4.1.10 Invertebrates

7.4.1.10.1 White-clawed Crayfish

White-clawed crayfish Austropotamobius pallipes are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive. White-clawed crayfish have not been recorded on site nor is this species recorded within the 10km square within which the site is located. However, white clawed Crayfish is one of the qualifying interests of the River Suir Lower SAC. In tandem with Otter surveys, a survey for any indications of the presence of White-clawed Crayfish was undertaken. No evidence of this species was observed.

7.4.1.10.2 Freshwater Pearl Mussel

In tandem with Otter surveys, a survey for any indications of the presence of Freshwater Pearl Mussel was undertaken. No evidence of this species was observed.

7.4.1.10.3 Lamprey species

In tandem with Otter surveys, a survey for Lamprey species was undertaken. No evidence of this species was observed.

7.4.1.10.4 Other Invertebrates

Butterfly are known to favor nectar-rich flowers and often species specific larval foodplants . Preferred species include cock's-foot grass (Dactylis glomerata), bird's-foot trefoil (Lotus corniculatus), common nettle (Urtica dioica), Lady's smock (Cardamine pratensis), Ivy (Hedra helix, H. hibernica) (Butterfly Conservation Ireland 2020). The Wet grassland/Willow Scrub habitat onsite is likely to be a key nectar resource on site for both bees and butterflies.

Damselflies and Dragonflies are typically found at slow moving or stagnant water bodies such as wetlands, river mires and flood lands, however they have adapted to artificial habitats such as ponds and canals (Fox and Cham 1994). These species are carnivorous predators throughout their life cycles and are used as bio-indicator species for water quality as they have low tolerances for pollution, with juveniles spending the entirety of their life in aquatic systems (Nelson et al., 2011). Suitable habitats within the Proposed Development site include the two remaining settlement ponds.

7.5 Identification of KERs

Table 7-16 summarizes the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance. Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features, as per the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Developments (NRA 2009).

All designated areas for nature conservation that lie within the ZoI of the Proposed Development are considered to be KERs given that they are sites selected specifically for biodiversity conservation and are potentially at risk of impacts from the Proposed Development. Those designated areas for nature conservation that lie beyond the ZoI of the Proposed Development are not considered to be at risk of impact and are therefore not considered to be KERs.

In all cases, habitat and species valued as being of Local Importance (Higher Value), or higher, are considered to be KERs as they are important contributors to the local biodiversity resource and are of conservation concern, at least locally.

Non-native invasive plant species are considered KERs, as they can result in negative effects on biodiversity, and it is in that context they are included within the impact assessment.

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Table 7-16 Summary of Ecological Valuation and Identification of KERs

Ecological Receptor	Ecological valuation	KER?
Designated sites		
Lower River Suir SAC 002137	International importance	**Yes**
Tramore Dunes and Back Strand SAC 000671	International importance	**No**
Tramore Back Strand SPA 004027	International importance	**No**
Mid Waterford Coast SPA 004193	International importance	**No**
pNHA, Lower River Suir 000399	National importance	**Yes**
pNHA, Portlaw woods 000669	National importance	**Yes**
pNHA, Grannyferry 000833	National importance	**No**
pNHA , Kilbarry Bog 001700	National importance	**No**
pNHA, Fennor bog 001697	National importance	**No**
pNHA Carrickavrantry Reservoir 000660	National importance	**No**
pNHA Ballin Lough, 001691	National importance	**No**
Habitats		
WL2 Treeline	Local importance (Low value)	**No**
WL1 Hedgerow	Local importance (Low value)	**No**
HD1 Dense Bracken	Local importance (Lower value)	**No**
WS1/GS2 Scrub and dry meadow mosaic	Local importance (Lower value)	**No**
GSi2 Improved meadow	Local importance (Lower value)	**No**
BC1 Arable crops	Local importance (Lower value)	**No**
BL3 Buildings and artificial surfaces	Local importance (Lower value)	**No**
ED2 Spoil and bare ground	Local importance (Lower value)	**No**
FL8 Artificial lakes	Local importance (Moderate value)	**No**
GA1 Agricultural grassland	Local importance (Lower value)	**No**

Ecological Receptor	Ecological valuation	KER?
GS2/GS4 Dry meadow and wet grassland mosaic	Local importance (Moderate value)*	**No**
GS2 Dry meadow	Local importance (Lower value)	**No**
WD4 Conifer plantation	Local importance (Lower value)	**No**
WS1 Scrub	Local importance (Lower value)	**No**
WN6 Native Wet Willow, Alder, Ash woodland	Local importance (Higher Value)	**Yes**
FW1 Whelan's Bridge River	Local importance (Higher value)	**Yes**
FW2 Whelan's Bridge River tributary	Local importance (Higher value)	**Yes**
Flora species		
Flora species listed on the flora Protection Order	None present	**No**
Flora species on Ireland's Red lists (Vulnerable or of higher concern concern)	None present	**No**
All other non-Red listed flora	None present	**No**
Non-native Alien Invasive plant species	Third Schedule-listed species	**Yes**
Fauna Species		
Bats	Local importance (Higher value)	**Yes**
Otter	Not present	**No**
Other mammal Species protected under the wildlife Act	Local importance (Moderate value)	**No**
Qualifying Interests bird species proximate SPAs	No QIs observed utilizing habitats present	**No**
All other red-listed bird species	Local importance (moderate level)	**No**
All other amber listed bird species	Local importance (moderate level)	**No**
Any other green listed bird species	Local importance (moderate level)	**No**
All other wintering bird species	Local importance (moderate level)	**No**
Reptiles	Not present	**No**
Amphibians	Local importance (moderate level)	**No**

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Ecological Receptor	Ecological valuation	KER?
Lamprey species	Not observed on site	**No**
Fish species	Local importance (moderate level)	**No**
White-clawed Crayfish	Not observed on site	**No**
Freshwater pearl Mussel	Not observed on site	**No**

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7.6 Potential Impacts

7.6.1 Potential Impacts

The following Section presents the assessment of potential impacts on biodiversity within the ZoI of the Proposed Development. As outlined in Section 7.5, this is focused on the KERs identified in table 16. This includes consideration of the "Do Nothing impact" scenario i.e., the existing trends with the potential to affect biodiversity in the absence of the Proposed Development.

7.6.2 Characteristics of the Proposed Development

A detailed description of the Proposed Development and construction activities are provided in Chapter 2 (Proposed Development Description), The main characteristics of the Proposed Development of relevance to the ecological assessment are outlined under demolition, construction and operation phases in the following sections. Work on site is not scheduled to begin onsite until Q4 2026. Adequate design and mitigation measures have been included in the design based on the adequate baseline passement undertaken.

Habitats onsite which will be impacted upon are primarily highly modified habitats; intensively managed Agricultural farmland and semi natural habitats including mosaics of wet and dry grassland and scrub. The loss of semi natural habitats is temporary following installation of the solar panels. These areas will revegetate over time through natural regeneration of native species.

The construction phase will pose the most risk of potential environmental impacts on biodiversity due to the intrusive works involved. The works will be carried out onsite in three phases

- Enabling works of the site, access, berms and cut & fills and village centre (completion date 2029)
- Technology park construction will begin in 2026 and be completed by 2030
- Finally, the Solar farm & BESS will start construction in Q2 2028 lasting 23 months with expected completion in Q1 2029

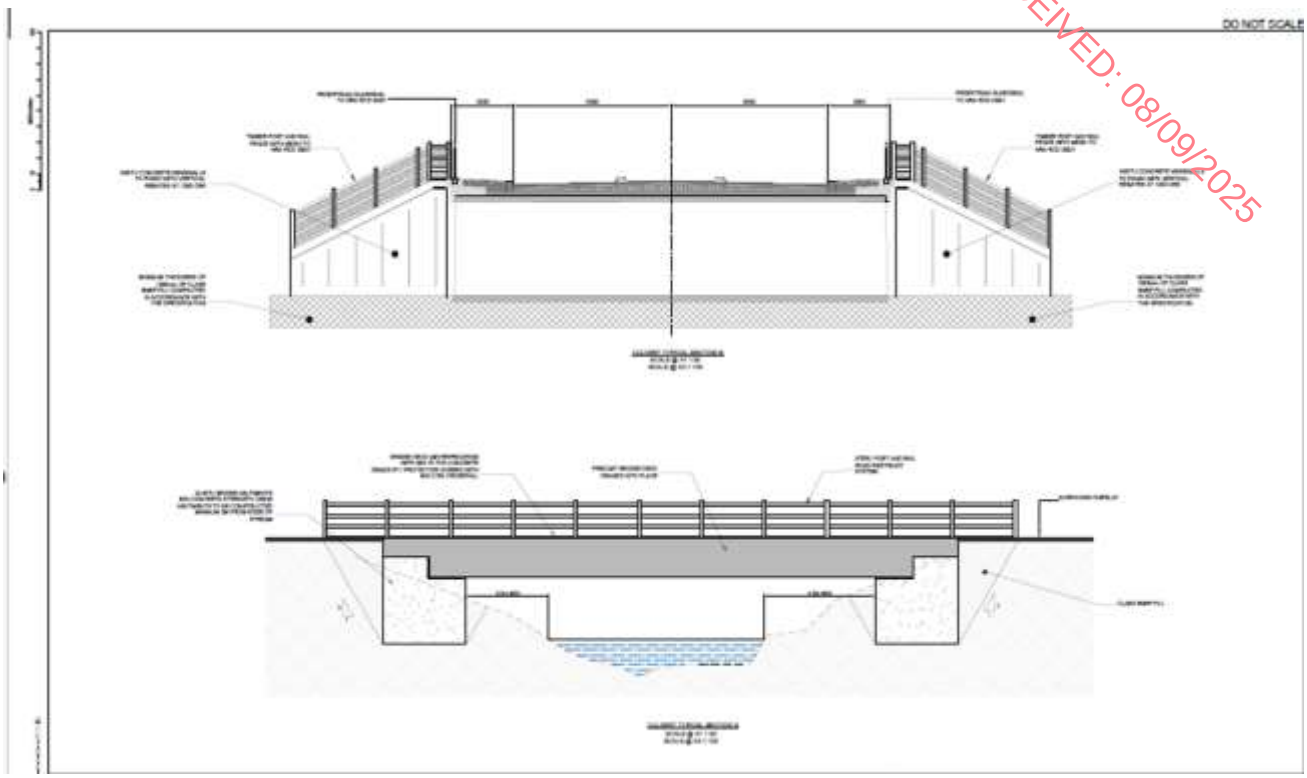
The main characteristics of the Construction Phase of the Proposed Development that have potential for ecological impact are:

- Land take
- Demolition
- Potential for impacts on hydrology leading to sedimentation
- Structural work (installation of an access bridge across the Whelan's Bridge River tributary

The Proposed new village center and technological park will have a considerable amount of construction and excavation work. These fist two phases of construction are limited to the North of the site where there are a limited number of KERs. Chief among the KERs in this area is the tributary of the Whelan's Bridge River. It is planned to put a bridge over the tributary as outlined in Figure 7-41. There will be no instream works.

Figure 7-41 Proposed bridge over the tributary of Whelan's Bridge River. (Atkins drawing – see engineering report)

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This phase will likely have the least potential impact on biodiversity. The fields in which the works are to be carried out to construct the village center and technology park are characterized by low species diversity. This low species diversity is due to agricultural management and the significant amount of hard standing remnant of the old cheese factory.

The solar farm will require minimal excavation although there will be minor loss of biodiversity through land take. This loss of biodiversity will be temporary as the land beneath the solar panels recover following installation.

7.6.2.1 Estimated Project Duration

The Development is expected to start construction in Q4 2026 when grant of planning is received. Phase one consists of enabling works of the site, access, berms and cut & fills etc. This is expected to last between 4-6 months. The village center is expected to be completed in Q2 2029 with works expected to last between 24-36 months. The data centers will also begin in Q2 2026, works is expected to last 39 months coming to completion in Q1 2030. The energy center will start in Q4 2026 with works expected to be 24 months coming to completion in Q4 2028. The Solar farm & BESS will start construction in Q2 2028, lasting 23 months with expected completion in Q1 2029.

7.6.2.2 Operational Phase

The main characteristics of the Operational Phase of the Proposed Development that have potential for ecological impact are:

- Management of onsite habitats
- Increase in disturbance due to increased human activity onsite associated with the planned walkway
- Increase in Noise and Disturbance associated with the gas turbines.

- Impacts on hydrology associated with the day-to-day operation of the technology park and New Village Centre.

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7.6.3 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Development would not be implemented. Thus, the existing baseline biodiversity would remain the same. It is assumed that the current land management regime will be retained.

The impact of no construction is neutral upon biodiversity in the *environs* of the Proposed Development. The Receiving Environment (see Section 7.5) describes the existing land use surrounding the Proposed application site.

7.6.4 Construction Phase

The activities required for the construction phase of the Proposed Development represent the greatest risk of potential impact on biodiversity within the ZoI. These activities primarily pertain to the site preparation, demolition, excavation and infilling activities required to facilitate construction of the Proposed Development.

7.6.4.1 Designated Areas for Nature Conservation

This Section describes and assesses the potential for the construction of the Proposed Development to result in likely significant effects on designated areas for nature conservation at SACs, SPAs, NHAs or pNHAs. In the context of European sites this is focused on the habitats and species for which the sites are selected (i.e., QIs for SACs and SCI species for SPAs, and the conservation objectives supporting their conservation status in each site). This assessment is directly related to the assessment methodology for European sites required under the Habitats Directive, which is presented separately in the Natura Impact Statement (NIS) prepared for the Proposed Development (and submitted with the application for approval).

In the case of NHAs and pNHAs the assessment considers whether the integrity of any such site would be affected. For the avoidance of doubt, it should be noted that, if the Proposed development would adversely affect the integrity of a European site, then this would constitute a likely significant effect in the context of the EIA Directive.

7.6.4.2 European sites

In the context of assessing whether the Proposed Development is likely to result in an impact on the integrity of any European sites, the NIS considers whether the Proposed Development will affect the conservation objectives supporting the favorable conservation condition of any European sites' QIs / SCIs and, as a result, presents an assessment of whether the integrity of any European sites would be affected – i.e. if the Proposed Development would adversely affect the integrity of a European site, this would constitute a likely significant effect in the context of the EIA Directive. The Proposed Development site has a hydrological connection/pathway with the Lower River Suir SAC (Site Code: 002137), located c. 915m north-east (linear distance) and c. 1.2km downstream in the Upper Suir Estuary transitional waterbody, through the Whelan's bridge Tributary 1 and Whelan's bridge River which receive direct run-off and baseflow contributions from the Proposed Development area.

The Proposed Development site also has a hydrological pathway/connection through the Suir Rivers with the River Barrow and River Nore SAC (Site Code: 002162), located c. 16.7km east (linear distance) and c. >20km downstream which eventually outfalls to Waterford Harbour coastal waterbody (European Code: IE_SE_100_0000). The latter connections are lengthy hydrological pathways allowing significant time for settlement and dilution and as such there is no potential for a change in water quality at the River Barrow

and River Nore SAC or Waterford Harbour coastal waterbody, which could impact on the habitat requirements.

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The nature and scale of the Proposed Development, the identified potential impacts and their relationship to European sites were considered in order to determine which European sites were located within the ZoI of the Proposed Development, in view of best scientific knowledge and in view of conservation objectives, and therefore potentially at risk of the planned Development affecting their conservation objectives. The potential impacts associated with the Development proposal are discussed below in relation to those European sites within its ZoI (further information can also be found within the NIS which accompanies the Planning application).

The ZoI is a distance within which the Proposed Development could potentially affect the conservation condition of QI habitats or QI / SCI species of a European site.

The mechanism to define the ZoI is summarized as follows:

- Consider the nature, size and location of the Proposed Development;
- Consider the sensitivities of the ecological receptors;
- Identify impact sources and pathways; and,
- Determine the ZoI based on the extent of the impact.

The Appropriate Assessment of the proposed development considered that the Proposed Development was had potential to likely significantly impact:

- Lower River Suir SAC;

The following potential effects on European sites have been identified based on the existing ecological environment and the extent and characteristics of the Proposed Development (see information provided below for detailed description of each potential impact):

- Habitat loss and fragmentation;
- Habitat degradation/effects on QI / SCI species as a result of hydrological impacts; and
- Habitat degradation as a result of introducing / spreading non-native invasive species.,

The nearest European site with groundwater dependent QI habitats / species is the Lower River Suir SAC which is located approximately 915m km North and downstream and within the ZoI of hydrological impacts.

All European sites within the vicinity of the Proposed Development lie beyond the ZoI for air quality impacts (50m from the Proposed Development boundary. Therefore, there is no potential for impacts on European sites as a result of effects on air quality.

7.6.4.3 Habitat Loss and Fragmentation

The Proposed Development does not overlap with any European sites, and the nearest European site, with a hydrological connection to the Proposed site is the Lower River Suir SAC. Therefore, there is no potential for direct habitat loss and fragmentation to occur.

Habitat loss may occur indirectly as a consequence of habitat degradation arising from a reduction in water quality and / or a change to the hydrological regime.

Following extensive survey work during the winter of 2024/25 it is concluded by the authors that this site is not an *ex-situ* feeding site for Qualifying Interests from proximate SPAs. A breeding wader survey identified that the habitats present are not utilised by breeding Curlew. The construction of the Proposed Development will not lead to loss of habitat suitable to support Qualifying Interests of proximate SPAs.

In respect of otter there were no otter breeding or resting places, holt or couch sites present within the footprint of the application site. During targeted otter surveys there were no indications of regular otter presence. Therefore, there will not be any loss of holt or couch sites as a result of construction works and no adverse impact on this species

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There was no observations of White-clawed Crayfish, Freshwater Pearl Mussel or Lamprey species within the application footprint and there will, therefore, be no adverse impacts on these species.

There will be no loss of Annex I habitats and or habitat supporting Annex II species for which European sites are designated for within the ZoI of the Proposed Development will not result in any direct loss or fragmentation of habitat by virtue of the location of the Proposed Development and its construction.

7.6.4.4 Habitat Degradation / Effects on QI / SCI Species as result of Hydrological Impacts

The Proposed Development is hydrologically connected to The Lower River Suir. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. Such a potential pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilized suspended solids; and the accidental spillage and/or leaks of contaminants into receiving waters. This occurrence could happen at any time during construction but could potentially be exacerbated by the removal of vegetation. In the absence of mitigation, the associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the discharge point or location of the accidental pollution event. Such an occurrence, of a sufficient magnitude, either alone or in combination with other pressures on water quality, could undermine the conservation objectives of the European sites downstream of the Lower River Suir.

A reduction in water quality as a result of an accidental pollution event (either alone or in combination with other pressures on water quality) could result in the degradation of the local aquatic environment, which could in turn negatively affect the populations of aquatic species downstream, for example through direct contact with pollutants, a decline in fish prey or bioaccumulation.

7.6.4.5 Habitat Degradation as a Result of Introducing / Spreading Non-Native Invasive Species

A minimum of three species of Third Schedule of the (Birds and Natural Habitats) Regulations 2011, are present on site, 2 more have been identified as being in the 10km grid square in which the site is located (see Table 10). In the absence of mitigation, there is potential for these species to spread or be introduced, during construction and / or routine maintenance / management works. These in turn may result in the degradation of the existing habitats, in particular, potentially outcompeting other native species and affecting species composition and physical structure of the habitat. Therefore, it is possible that the spread / introduction of non-native invasive species could adversely impact the conservation objectives of the Lower River Suir.

7.6.4.6 Natural Heritage Areas and Proposed Natural Heritage Areas

In the case of NHAs and pNHAs the assessment considers whether the integrity of any such site would be affected by the Proposed Development with reference to the ecological features for which the site is designated or is Proposed for designation.

Considering the ZoI of the Proposed Development, in the absence of mitigation measures the Proposed Development has the potential to have a likely significant effect upon the following one 2 pNHAs:

- Lower River Suir pNHA 000399
- Portlaw woods pNHA 000669

7.6.4.7 Habitat Loss and Fragmentation

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The Proposed Development will not result in any direct impacts to the Lower River Suir pNHA, there will be no land take required from within the pNHA boundary.

The Proposed Development will not result in any direct impacts to the Portlaw woods pNHA, there will be no land take required from within the pNHA boundary

The Proposed Development will not result in any habitat loss or fragmentation effects on either of pNHAs as both sites are hydrologically upstream of the site.

7.6.4.8 Habitat Degradation – Surface Water Quality

During the Construction Phase, contaminated surface water runoff and / or an accidental spillage or pollution could not impact upon the Portlaw woods pNHA or Lower River Suir pNHA as both are located upstream of the site.

7.6.4.9 Habitat Degradation – Groundwater

The potential for hydrogeological impacts is dependent on the nature of the proposed works at specific locations and the receiving environment ground conditions. Any drawdown from excavation associated with the Proposed Development is expected to be limited, localized, and temporary, they are not expected to extend to any pNHA site however cannot be excluded.

In the absence of mitigation, there is a risk of pollutants entering the groundwater as a result of spillages or accidents, and in such circumstances, this would result in a temporary change in water quality. Therefore, mitigation measures, as described in Chapter 6 (Hydrology and Hydrogeology) and listed in the Preliminary CEMP are required to address this potential impact.

7.6.4.10 Habitat Degradation as a Result of Introducing / Spreading Non-Native Invasive Species

Three non-native invasive plant species listed on Part (1) of the Third Schedule of the European Communities (Birds and Habitats Regulations) 2011 as amended were identified within the footprint of the Proposed Development; Japanese knotweed, New Zealand Pigmyweed and Water Fern. It is unlikely that species would spread or be introduced, during the Construction Phase to either the Lower Suir pNHA or the Portlaw Woods pNHA. These pNHA sites are located a considerable distance from the Proposed Development.

There is no potential for in combination effects to occur in association with other activities / plans / projects.

Mitigation measures required to avoid this potential impact are not required.

7.6.4.11 Habitat Degradation – Air Quality

Dust emissions associated with construction works could, in extreme circumstances, affect adjoining habitats, potentially burying sensitive habitats or plant species. Best practice construction methodologies and mitigation measures have been designed to minimize construction generated dust and to contain it within the boundary of the application site. Mitigation measures in respect of managing construction dust are provided in the Air Quality Chapter 8.

7.6.4.12 Habitats

This Section assesses the potential effects of the Proposed Development on habitats. In terms of quantifying the magnitude of effects on habitats, the estimated percentage of the local habitat resource

being affected is based upon the total area of a given habitat type that was recorded within the study area of the Proposed Development. This provides some local context as to the magnitude of the habitat loss and whether the impact is significant or not, and at what geographic scale.

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Table 7-17 The percentage habitats to be lost through land take

Habitat type	Agricultural grassland (GA1)	Scrub/improved dry meadow mosaic (WS1/GS2)	Arable farmland (BC1)	Wet grassland (GS4)	Wet grassland/ improved dry grassland mosaic (GS2/GS4)
% Decline	34%	32%	72%	66%	22%

The construction of the Proposed Development will result in habitat loss across the application site. This occurs in the form of temporary/permanent land take of some habitats.

The dominant habitat type to be lost is that of improved agricultural grassland. Much of this habitat occurs onsite as either fields reseeded in recent years with *Lolium perenne* or those which have been sprayed and is thus of very little biodiversity value. These fields are not included in the KER of the application site. The remaining areas within the footprint of the Proposed Development comprise of habitats considered to be of a Local Importance (Lower Value). These include dry meadows and grassy verges (GS2), wet grassland (GSi4) areas of disturbed ground (ED2), scrub (WS1) and hard standing (BL3). These habitats are located within existing farm, and as such are highly modified/disturbed. No habitat of national importance will be destroyed by the project.

The overall total areas of the habitat types which overlaps with the Proposed Development boundary and are directly lost as a result of the construction of the Proposed Development is provided in Table 7-17.There will be no KER habitats affected by the Proposed Development.

7.6.4.13 Habitat Degradation – Surface Water Quality

During construction, possible contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment.. In a worst-case scenario, the downstream habitats of the Lower Suir SAC could be affected. Though it should be noted that the effect on water quality would be temporary only.

It is unlikely that a pollution event of such a significant magnitude would occur during construction or if it did occur, it would be temporary in nature. Nevertheless, a precautionary approach has been adopted in the assessment of potential risk of impacts on water quality. Consequently, detailed mitigation measures are proposed to further minimize the risk of contaminated surface water runoff and / or an accidental spillage or pollution event of the Proposed Development having any perceptible effect on water quality during construction.

Construction works in close proximity to the Whelan's Bridge River, and its tributary could possibly result in generated silt / sediment being released into these surface water features in the absence of mitigation. There is no potential for a prolonged effect. Any accidental leak/run-off with silt (without mitigation) could result in a temporary effect on water quality.

Annex I habitats contained in the Lower River Suir SAC could be affected (without mitigation) and therefore, effects on surface water quality have the potential to result in a significant negative impact at a national scale, in the case of the aquatic / wetland Annex I and pNHA habitats located within the ZoI of the Proposed Development.

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7.6.4.14 Habitat Degradation – Hydrological Regime

During the Construction Phase, the potential for temporary disruption to local drainage systems and hydrological regimes have been assessed in relation to the Proposed Development. This is not predicted to result in a likely significant negative effect on any aquatic habitats or species through effects on the hydrological regime (for more detail refer to Chapter 6 Hydrology and Hydrogeology). In addition, as detailed in the Construction and Environmental Management Plan (CEMP) for the Proposed Development specific controls / mitigation measures have been identified for implementation to manage runoff and minimize pollution to receiving waterbodies during the Construction Phase.

7.6.4.15 Habitat Degradation – Groundwater

Any effects on the existing hydrogeological baseline supporting wetland habitats, has the potential to negatively affect habitat extent and distribution, and vegetation structure and composition. The potential effects upon the existing hydrogeological regime are not necessarily limited to habitats within the Development boundary but can be far-reaching, with significant negative long-term effects. As discussed in Chapter 5 (Land, Soils, Geology & Hydrogeology), the Proposed Development may involve the excavation of potentially contaminated ground, result in damage to the aquifer, or change the existing groundwater regime.

Groundwater dependent habitats were not identified in close proximity to the Proposed Development, therefore any potential impacts as a result of the Proposed Development arise with the interaction between groundwater and surface water.

It is predicted that while there may be no direct impact on the groundwater regime, there is potential for indirect impacts associated with the Proposed Development through surface water interaction There are no significant surface water or groundwater abstractions proposed during construction, therefore no potential impacts on the existing surface water and groundwater regime. As detailed in the Construction Environmental Management Plan (CEMP) for the Proposed Development, Surface Water Management Plan (SWMP) including pollution control measures which will be put in place to manage runoff and minimize pollution to receiving waterbodies during the Construction Phase.

7.6.4.16 Habitat Degradation – Air Quality

As discussed in Chapter 8 (Air Quality), the Proposed Development has the potential to generate dust during construction works which could affect vegetation in habitat areas adjacent to the Proposed Development.

The mitigation measures to control dust emissions during the Construction Phase are outlined in Chapter 8 (Air Quality) and in the CEMP. These include standard measures to control nuisance dust such as inspection and cleaning of public roads, measures for stockpiling of materials within construction compounds, water misting / spraying, vehicle coverings, and hoarding around the construction compound.

Air quality modelling of NOx concentrations, and deposition rates, were modelled for the Construction Phase of the Proposed Development at distances up to 250m from the proposed road development (refer to Chapter 8 (Air Quality for details). The results from the Air Quality modelling deem the ecological impacts of the Proposed Development, with regards air quality, and impacts will be direct, short-term, negative, localized and not significant. As such harmful effects on vegetation from these emissions are not likely.

7.6.4.17 Habitat Degradation – Non-native Invasive Plant Species

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Planting, dispersing, or allowing / causing the dispersal, spread or growth of certain non-native plant species (and / or vector material such as soil that is contaminated with these non-native species) is controlled under regulation 49 of the (Birds and Natural Habitats) Regulations and refers to plant or animal species listed on the Third Schedule of those regulations (and further by the European Union (Invasive Alien Species) Regulations 2024).

The accidental spread of such non-native invasive plant species as a result of construction works has the potential to impact on terrestrial as well as riparian/ aquatic habitats, potentially affecting plant species composition, diversity and abundance over the long-term. This is not only confined to habitats immediately adjacent to the footprint of the Proposed Development but includes habitat areas along the network of proposed haul routes associated with the Proposed Development.

The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g., designated area for nature conservation or areas of Annex I habitat) have the potential to result in a likely significant negative effect, at geographic scales ranging from local to international.

There were three non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations, 2011 which was identified within the boundary of the proposed development; Japanese New Zealand Pigmyweed and Waterfern. The Ponds 1 and 2 contain New Zealand pigmy weed, Pond 2 contains Water fern. The location of Japanese Knotweed onsite was not recorded when it was first observed as the dead stalks had been wind blown and the spread of the plants could not be defined. However, it can be noted that the general location was in the southwest of the site.

7.6.4.17.1 Bats

Roost Loss

An assessment of bat activity of the site, using both static monitors and an emergence/dawn survey indicated that the *environs* of the application footprint is not utilised by roosting bats.

Habitat Loss as a result of Fragmentation of Foraging / Commuting Habitat and Commuting Routes

Bats rely on suitable semi-natural habitats which support the insect prey upon which they feed. An assessment of bat activity of the site, using both static monitors and an emergence/dawn survey indicated that the Proposed Development will not result in the loss of important foraging/commuting corridors or foraging habitat.

Installation of Lighting which May Cause Direct / Indirect Disturbance of Flight Patterns

Bats are nocturnal animals that have adapted to a life in darkness, partly to avoid predation. Artificial illumination of foraging habitat/commuting corridors can cause disturbance to . The proposed development will require some artificial lighting during the construction of the New Village Centre, which has the potential to impact on foraging/commuting bats.

Mitigation measures are detailed to limit the effects of artificial lighting in section 7.7.1 during the construction phase

Table 7-18 Summary of Potential Construction Phase Impacts (Pre-mitigation)

Ecological Receptor	Ecological valuation	Potential Impacts	Potential significance
Designated areas for nature conservation			
Lower River Suir SAC	International importance	Habitat degradation (hydrology; non-native invasive plant species)	POTENTIAL
Lower River Suir pNHA	National Importance	Habitat degradation (hydrology; non-native invasive plant species)	POTENTIAL
Portlaw woods pNHA	National Importance	Habitat degradation (hydrology; non-native invasive plant species)	POTENTIAL
Rare/Protected/Invasive plant species			
Non-native invasive plant species	N/A	Spread at expense of other habitats, habitat degradation (hydrology)	POTENTIAL
Fauna Species			
Bats	Local Importance (Higher Value)	Disturbance	POTENTIAL
Local Biodiversity Areas			
WN6	Local Importance (Higher Value)	Habitat degradation (hydrology, non-native invasive plant species)	POTENTIAL
Whelan's Bridge River	Local Importance (Higher Value)	Habitat degradation (hydrology, non-native invasive plant species)	POTENTIAL
Whelan's Bridge River tributary	Local Importance (Higher Value)	Habitat degradation (hydrology, non-native invasive plant species)	POTENTIAL

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7.6.5 Operational Phase

7.6.5.1 Designated Areas for Nature Conservation

7.6.5.1.1 European Sites

Habitat Loss and Fragmentation

The potential for impacts on Qualifying Interest bird populations for which SPAs are designated has been provided in the Natura Impact Statement (NIS). There will be no adverse impacts.

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Habitat Degradation / Effects on QI / SCI Species as a result of Hydrological Impacts

The Proposed Development is hydrologically connected to the Lower River Suir SAC via the Whelan's Bridge River and its tributary. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation is not a likely event as there is no bulk fuel on site (HVO only) and the design includes interceptors and SUDS design to manage run-off quality for minor leak/spills. In addition buffers are implemented in design to ensure no change in run-off quality.

As such there is no potential that water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present within these European sites, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat.

The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation cannot occur due to the design measures in place. These measures negate potential for contamination to surface water. Design measures include River buffers, oil interceptors and SUDS attenuation ponds. A source-pathway-linkage, therefore, does not exist.

Habitat Degradation as a result of Introducing / Spreading Non-Native Invasive Species

There are three species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended) present within the Proposed Development area (New Zealand pygmy weed, Water fern and Japanese knotweed). In the absence of mitigation, there is potential for spread or be introduced during routine maintenance/ management works, to terrestrial/aquatic habitat areas in European sites downstream. These in turn may result in the degradation of the existing habitats and therefore undermine the conservation objectives of European sites.

Natural Heritage Areas and Proposed Natural Heritage Areas

The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation is not a likely event as there is no bulk fuel on site (HVO only) and the design includes interceptors and SUDS design to manage run-off quality for minor leak/spills. In addition, buffers are implemented in design to ensure no change in run-off quality.

As such there is no potential that water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present within these Nationally important sites, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat.

The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation cannot occur due to the design measures in place. These measures negate potential for contamination to surface water. Design measures include River buffers, oil interceptors and SUDS attenuation ponds. A source-pathway-linkage, therefore, does not exist.

7.6.5.2 Habitats

Habitat Degradation - Surface Water Quality

Mitigation for the Operational Phase has been built into the design of the Proposed Development, see Hydrology and Hydrogeology chapter (6.5.3).

Habitat Degradation – Hydrological regime

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The gradual introduction of impermeable surfaces and the compaction of soils across the construction site as a result of the land clearing and earthworks will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off along with sediment loading, which could potentially impact local drainage and result in habitat degradation if not adequately mitigated. This increase in the rate and volume of direct surface run-off can result in increased sediment loading, scouring impacts on local drainage and watercourses, and downstream impacts. Prior to the installation of attenuation ponds there may be a resultant minor increase in flow to offsite drainage.

There are no significant surface water or groundwater abstractions proposed during construction, therefore no potential impacts on the existing surface water and groundwater regime.

There are no proposed permanent diversions of any drainage ditches or waterbodies as part of the proposed development.

The proposed bridge crossing on the Whelanbridge Trib 1 EPA river waterbody, to facilitate the new access roads off the R680 and R681 regional roads will be constructed without any instream works and constructed in compliance with the relevant guidance and legislation and the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

In the absence of mitigation measures the potential impacts during the construction phase on surface water and groundwater quantity and flow are ***negative***, ***not significant*** and ***short term***.

(for more detail refer to Chapter 6 (Hydrology and Hydrogeology).

Habitat Degradation – Non-Native Invasive Plant Species

Three invasive plant species, Japanese knotweed, Water fern and New Zealand Pygmyweed listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended), were within the boundaries of the Proposed Development. In the absence of mitigation, there is potential for routine maintenance works to inadvertently spread contaminated vegetation cuttings both within the Proposed Development boundary, and within the immediate vicinity.

The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g. designated areas for nature conservation or areas of Annex I habitat) has the potential to result in a significant negative effect, at geographic scales ranging from local to international.

Mitigation measures have been designed to avoid this potential impact (see Section 7.1.1).

Habitat Degradation – Air Quality

The key works which will have a potential impact on air quality during operation of the Proposed Development are summarized below:

- The operation of the gas turbines and back-up generators will release air pollutant emissions (primarily NOx emissions).
- Road traffic accessing the site will emit air pollutants and greenhouse gases.

The impact to Air Quality and Biodiversity in the operational phase will be long-term, direct, localized and not significant. As such harmful effects on vegetation from these emissions are not likely. (For more detail see the Air Quality Chapter 8).

7.6.5.2.1 Bats

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The Proposed Development will result in the removal of grassland habitats which will revegetate over time. Bats generally avoid open grassland habitats. The primary foraging/commuting areas of habitat such as woodland, the riparian corridor, Ponds (1) and (2) will be unaffected by the proposed development. These habitats constitute a landscape feature used by foraging/commuting bats and should be retained.

Indirect Disturbance of Light Patterns Due to Operational Lighting

Additional permanent lighting features within suitable habitat may result in avoidance behavior by bats. Such displacement could prevent bats from accessing foraging areas . Increased artificial lighting is not considered to be significant at any geographic scale. This is because the lighting strategy limits artificial lighting to the Proposed new village and technology park. Artificial lighting is already in place, adjacent to the Proposed Development in the existing village at Kilmeaden, bat species who utilize the area would already be habituated to some level of artificial lighting. There will be no lighting around the solar farm. The effects of operational artificial lighting on bat species is, therefore, not considered to be significant at any geographic scale.

Impacts of solar farms on Bats

Solar farms can negatively impact bat activity and feeding behavior due to habitat loss, fragmentation, and changes in foraging conditions. Specifically, bats may shift their flight patterns, reduce prey capture attempts, and show decreased activity at solar farm sites compared to control areas. These impacts are particularly noticeable for certain bat species and are more pronounced at field boundaries and in open fields.

Disturbance / Displacement – Increased Human Activity

The Village and Technology Centre are located adjacent to the village of Kilmeaden where human activity is evident. Populations of bats associated within this area of the Development proposal are likely to be habituated to a certain degree of human disturbance. A road runs the length of the Eastern boundary where human activity is also commonplace. Disturbance to bats is most likely to occur within the region allocated to rewilding and the solar farm. Access to this area at night could be minimized to avoid disturbance. No significant effect as a consequence of increased human activity to bats are predicted.

7.6.6 Summary of Potential Operational Phase Impacts (Pre-mitigation)

Table 7-19 Summary of Potential Operational Phase Impacts (Pre-mitigation)

Ecological receptor	Ecological valuation	Potential Impacts	Potential Significance
Lower River Suir SAC	International	Habitat degradation (hydrology; non-native invasive plant species	POTENTIAL
Lower River Suir pNHA	National	Habitat degradation (hydrology; non-native invasive plant species	POTENTIAL

Ecological receptor	Ecological valuation	Potential Impacts	Potential Significance
Portlaw woods pNHA	National	Habitat degradation (hydrology; non-native invasive plant species	POTENTIAL
Habitats outside of designated areas for nature conservation			
Whelan's Bridge River (FW2) and tributary	Local Importance (higher value)	Habitat degradation (hydrology)	POTENTIAL
Wet Woodland (WN6)	Local Importance (higher value)	Habitat degradation (hydrology)	POTENTIAL
Rare/Protected/Invasive plant species			
Non-native invasive plant species	N/A	Spread at expense of other habitats	POTENTIAL
Fauna			
Bats	Local Importance (higher value)	disturbance	POTENTIAL

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7.7 Mitigation Measures

The mitigation measures outlined relate primarily to the prevention of impacts associated with the Proposed Development on water quality, invasive species and KERs.

7.7.1 Construction Phase

A suitably experienced and qualified ecologist will be employed by the appointed contractor. The Ecological Clerk of Works will;

- Advise the appointed contractor on ecological matters during construction,
- Draw up and oversee the implementation of a Habitat and Biodiversity Management and Conservation Plan.

7.7.1.1 European sites

The mitigation measures that are required to ensure that the Proposed Development will not adversely affect the integrity of the European sites within the ZoI are presented in the Natura Impact Statement (NIS). Following a consideration and assessment of the Proposed Development on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during construction;
- Measures to prevent the spread of invasive species to downstream European sites; and,

7.7.1.2 National sites

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The mitigation measures in relation to potential impacts arising from the Proposed Development on pNHAs within the ZoI are as per those for European sites as the boundaries coincide with the River Suir SAC. Therefore, the mitigation measures outlined above in Section 7.5.1.1.1, and as detailed in the NIS, will prevent the Proposed Development resulting in a significant negative effect on the pNHAs at the national geographic scale. It should be noted that the full suite of mitigation measures proposed to protect surface water during the Construction Phase and to prevent the spread of invasive species to downstream European and national sites are set out in full in the CEMP.

7.7.1.3 Habitats

7.7.1.3.1 Habitat Loss and Fragmentation

No KER habitats will be impacted upon by the proposed development and no mitigation measures are required. A landscape management plan will form part of the works contract and include for ongoing maintenance of the planting scheme, see Chapter 11 (Landscape and Visual Impact) for further detail on the implementation of this plan.

The drawing up and implementation of a Habitat and Biodiversity Conservation Management Plan has the potential, however, to enhance the biodiversity resource present.

7.7.1.4 Habitat Degradation – Surface Water Quality

In terms of mitigation, the Hydrology and Hydrogeology Chapter 6 provides several control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Development (see chapter 6 sections 6.6.2.2, 6.6.2.3, 6.6.2.4, 6.6.2.5 and 6.6.2.6).

The Water Chapter details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Development.

It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required during the construction phase pursuant to conditions imposed by the Relevant Authority to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:

- Concrete pouring should not be undertaken when periods of high rainfall are forecast or during/immediately after periods of high rainfall;
- Washout of concrete delivery lorries will not be permitted within the vicinity of the Proposed Development location;
- Washout areas should not be located within close proximity of storm drains, drainage ditches or waterbodies;
- Washout areas should be communicated to delivery lorries and should be identified with appropriate signage;
- Washout will be permitted only within designated washout areas;
- To reduce the amount of wastewater, only concrete lorry chutes will be permitted to be washed down onsite;
- The contractor will collect and retain all concrete washout and solid waste in polythene lined leak proof container of adequate capacity so as to prevent material entering surface/ground waters;
- Retained concrete washout and solid waste should be removed and treated in a licenced waste facility.

Following implementation of the mitigation measures outlined in the SWMP, the majority of impacts will not be significant.

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7.7.1.5 Habitat Degradation – Groundwater

The following mitigation measures will be implemented with regard to pollution of soil and groundwater: The construction management of the site will be implemented by the appointed contractor will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams *et al.* 2001) to minimize as far as possible the risk of soil, groundwater and surface water contamination; and measures to be implemented by the appointed contractor to minimize the risk of spills and contamination of soils and waters to include:

- Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
- Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g., by a roll-over bund, raised kerb, ramps or stepped access;
- The location of any fuel storage facilities will be considered in the design of the Construction Compound. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded;
- Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase;
- Potential pollutants to be adequately secured against vandalism;
- Provision of proper containment of potential pollutants according to codes of best practice;
- Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and
- Spill kits will be provided and be kept close to the storage area. Staff to be trained on how to use spill kits correctly.

The mitigation measures to protect groundwater quantity and quality during the Construction Phase are also outlined in Chapters 5 (Land, Soils and Geology) and 6 (Hydrology and Hydrogeology).

7.7.1.6 Habitat Degradation – Air Quality

A series of mitigation measures will be implemented by the appointed contractor to minimize dust nuisance impacts:

- Public roads affected by the Proposed Development works will be regularly inspected for soiling associated with the construction activities and cleaned as necessary;
- Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods;
- During movement of dust generating materials both on and off-site, trucks will be covered with tarpaulin, and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; and,
- The appointed contractor will provide a site hoarding along noise sensitive boundaries, at a minimum, at the Construction Compound, which will assist in minimising the potential for dust impacts off-site; and
- The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance associated with the Proposed Development occurring outside the works boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.

See the Air Quality Chapter 8 for further details and mitigation measures.

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7.7.1.7 Habitat Degradation – Non-Native Invasive Plant Species

A confirmatory pre-construction non-native invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and / or extent of all Third Schedule non-native invasive species within the footprint of the Proposed Development. Where an infestation is confirmed / identified, this will require the implementation of a non-native Invasive Species Management Plan.

The artificial ponds identified onsite contain several invasive plant species, 20m buffer zones will be in place around both ponds during construction and operation of the Proposed Development to prevent further spread of these species

Following the confirmatory pre-construction survey, the following mitigation measures will be implemented, as required:

- Where a pre-construction non-native invasive species re-survey has confirmed the presence of previously identified Third Schedule non-native invasive species, or identifies newly established non-native invasive species within the footprint of the Proposed Development, the ISMP produced will provide a detailed description of the infestations (e.g. approximate area of the respective colonies (m2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated.
- The ISMP will be updated following the pre-construction survey as advised by a suitably qualified specialist, with regard to the guidance on The Management of Invasive Alien Plant Species on National Roads (Technical Guidance) (TII 2020a; 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary.
- All control measures specified in the ISMP shall be implemented by a suitably qualified and licensed specialist prior to the construction of the Proposed Development to control the spread of non-native invasive species within the footprint of the Proposed Development. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Development.
- The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated as detailed in the ISMP.

7.7.1.8 Bats

7.7.1.8.1 *Bats*

Protection of Bats during Vegetation Clearance

No active roosts were identified during the surveys within the footprint of the Proposed Development.

The following generic mitigation measures should be implemented

- In the unlikely event that bats are found on the Proposed Development site during construction works such as vegetation clearance, works will immediately cease in that area, and the local NPWS Conservation Ranger will be contacted
- Enhancing habitats around the solar farm is recommended and would involve incorporating wildlife-friendly features into the landscape, promoting biodiversity, and minimizing negative impacts on local ecosystems. This can be achieved through various strategies, including native plantings, habitat creation, and sustainable management practice, this is dealt with in Appendix 2, Additional Mitigation Measures.
  Mitigation measures to reduce light spill will include the following:

- the use of sensor / timer triggered lighting;
- LED luminaires to be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- column heights to be considered to minimise light spill;
- accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed; and,
- Where night time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried adjacent to watercourses with known bat activity).

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7.7.2 Operational Phase

7.7.2.1 European Sites

The mitigation measures that are specifically required to ensure that the Proposed Development will not adversely affect the integrity of the European sites within the ZoI are presented in the NIS. Following a consideration and assessment of the Proposed Development on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during operation;
- Measures to prevent the spread of non-native invasive species to downstream European sites; and,
- Measures to prevent disturbance/displacement to Species of Conservation Interest.

7.7.2.2 National Sites

The mitigation measures in relation to potential impacts arising from the Proposed Development on pNHAs within the ZoI are as set out for European sites as the boundaries of the pNHAs follow those of the SAC. Therefore, the mitigation measures outlined in Section 7.5, as detailed in the NIS (which accompanies the application for approval), will prevent the Proposed Development resulting in a significant negative effect on these pNHAs.

7.7.2.3 Habitats

7.7.2.3.1 Habitat Degradation – Surface Water Quality

Mitigation for the Operational Phase has been built into the design of the Proposed Development. The increase in surface water run-off from the increase in impermeable area will be managed for the Proposed Development by the appointed contractor through a combination of measures outlined in the Hydrology and Hydrogeology Chapter 6 as follows;

- Porous Asphalt: Porous asphalt has been Proposed in the car parks. The significant storage capacity of porous asphalt pavement systems provides a cost-effective drainage solution for capturing and controlling the release of surface water. Porous Asphalt is designed to have a very high content of interconnected voids allowing passage of water through its body. The surface contains voids allowing water to rapidly drain from the surface down through the pavement.
- Filter Drain/swale drain: It is proposed to use oversized filter drainage throughout the site as interceptor across the Proposed Development to collect surface water runoff from landscape features. A filter drain is a stone filled trench, with a perforated pipe at the base. Runoff flows slowly through the granular material, trapping sediments and providing attenuation. Flow is then directed through the perforated pipe to the discharge point. The type of filter drain trench Proposed on the site will be lined with an impermeable geotextile membrane to prevent any infiltration to ground through the trench. It is proposed to use a swale drain along the edge of the internal road network where practicable. This drainage shall discharge to the surface water discharge network. Swales reduce the runoff flows through the system and providing a level of treatment by trapping sediments prior to entering the surface water network.

- Permeable Paving (Grasscrete): The Grassgrete paving will be constructed on suitable areas outside the buildings. Grasscrete is a 'source control' method. It will allow infiltration at source within the voids in the stone. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water and is a recognised part of the suite of SUDS.
- Attenuation ponds: Attenuation ponds will be installed prior to the outfall locations, and they allow for water storage and flow control, preventing excessive loading on the downstream surface water network. The attenuation ponds will be lined with an impermeable geotextile membrane to prevent any infiltration to ground.
- Infiltration tank: An infiltration tank will be installed under the north car park of the village centre to allow for surface water storage, as well as infiltration to the surrounding soil prior to discharging to the downstream network.
- Rainwater harvesting: Rainwater harvesting is the collection of rainwater runoff from roofs and other impermeable areas and using it as a supply of water for the building's purposes.

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The effective implementation of these measures will ensure that there is no increase in existing runoff rates from new hardstanding areas. The range of measures installed during the Construction Phase will reduce both the volume and rate of surface waters discharging into the surface water drainage network, as well as improving the environmental quality of any such discharges during the Operational Phase of the Proposed Development.

These standard drainage design controls have been proven through widespread use in developments across the country.

No additional mitigation is required.

7.7.2.3.2 Habitat Degradation – Non-Native Invasive Plant Species

Once the Proposed Development is operational, a yearly maintenance and management regime will be implemented to monitor invasive species onsite.

7.7.2.3.3 Habitat Degradation – Hydrological Regime

Given there are no significant effects on habitats owing to impacts from hydrological regime changes, no mitigation is required.

7.7.2.3.4 Habitat Degradation – Groundwater

Given there are no significant effects on habitats owing to impacts from groundwater changes, no mitigation is required.

7.7.2.3.5 Bats

The Operational Phase of the Proposed Development is not predicted to result in any significant effects to populations of bats in the vicinity of the Proposed Development as the primary foraging habitat will be retained and be unaffected. A landscape strategy has been developed for the design to enhance local biodiversity. The implementation of a Habitat and Biodiversity Conservation and Management Plan could enhance conditions for the local bat population.

7.8 Monitoring and Reinstatement Measures

7.8.1 Construction Phase

An Ecological Clerk of Works (ECoW) may be required to be appointed in advance of the Proposed works to oversee the management of ecological risks on site and ensure that works follow pre-determined methodology and conditions designed to prevent significant ecological impacts.

7.8.1.1 Bat Monitoring and Conservation Management plan

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Although no roosts occur, the habitats present are utilised by a number of bat species. Under Article 12 of the Habitats Directive (92/43/EEC) Member States area required to establish a system of strict protection for species listed in Annex IV of that directive. This protection is afforded to these species at all stages of the life cycle and wherever they occur. All Bat species in Ireland are listed in Annex IV. The undertaking of a Bat Monitoring and Conservation Management Plan post-construction should be undertaken in tandem with a Habitat and Biodiversity Conservation Management Plan in order to enhance the conditions occurring with regard to the local bat population. Non-native Invasive Plant Species Control and Management Plan.

7.8.1.2 Alien Invasive Plant Species

The pre-construction implementation of an Invasive Plant Species Control and Management Plan (IPSCM) is necessary to protect native ecosystems, prevent further spread of invasive species, and manage/eradicate existing populations. A Pre-construction survey will be undertaken by a suitably qualified specialist, to confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within Proposed Development boundary. Production of an IPSCM during the construction phase will;

Protect Native Ecosystems

Invasive plants can outcompete native species for resources like water, sunlight, and nutrients, leading to a decline in biodiversity and ecosystem health.

Prevent Further Spread

Invasive species can easily spread through various means, especially through human activity. A plan helps to identify and prevent the spread of these species, both within the site and beyond.

Manage Existing Populations

Invasive species (New Zealand Pigmyweed, Japanese Knotweed and Water fern) are already established on site, a plan outlining methods for controlling or eradicating them thereby minimizing their impact on the environment is required.

Comply with Regulations (including European Union (Invasive Alien Species) Regulations 2024)

The Third Schedule of S.I. No. 477 of 2011 – European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) lists New Zealand Pigmyweed, Japanese Knotweed and Water fern. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on the Third Schedule without a Licence. The two regulations that deal specifically with this scheduled list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species; and
- Regulation 50: Prohibition on dealing in and keeping certain species.

The following activities are strictly prohibited:

- Dumping invasive species cuttings anywhere other than in facilities licensed to accept them;
- Planting or otherwise causing invasives to grow in the wild. The appointed contractor) will be careful not to cause further spread under the supervision of the Ecological works.
- Disposing of invasive species at a landfill site without first informing the landfill site (that is licensed under Number 10 of 1996 - Waste Management Act, 1996 (as amended) to take such Third Schedule

material (plant or soil) that the waste contains invasive species material (this action requires an appropriate licence);
- Moving soil which contains Third Schedule-specific non-native invasive species in the Republic of Ireland, unless under license from the National Parks and Wildlife Service (NPWS) (this license is a separate from and does not discharge any person being in receipt of other necessary waste permits / licenses etc.); and
- Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (hereafter referred to as the IAS Regulation) lists specific 'Species of Union Concern', some of which overlap with the Third Schedule species. The IAS Regulation conveys the rules to prevent, minimize and mitigate the adverse impacts of the introduction and spread (both with and without intention) of invasive alien species on biodiversity and the related ecosystem services, as well as other adverse impacts on human health or the economy. Ireland's 4th National Biodiversity Action Plan 2023-2030 (National Parks and Wildlife Service (NPWS) 2023) requires that: "by 2023, invasive alien species are controlled, managed and where possible, eradicated". A target of Ireland's 4th National Biodiversity Action Plan 2023-2030 is to "reduce alien species by at least 50%"

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Be Cost-Effective

Early identification and management of invasive species can reduce the overall costs of control efforts later on.

Protect Human Interests

Invasive species can also impact human activities particularly in relation to the current Development where human wellbeing is emphasized through the provision of rewilding areas and a pedestrian walkway around the solar farm.

7.8.1.3 Installation of the Solar Farm

The area will be restored "Passively" – i.e., there will be no reseeding or fertilizing of the habitat. This will maximize the opportunities for biodiversity. Monitoring of the progress of recolonization will be required in order to inform the management plan as to whether additional measures, such as the importation and spread of "Green Hay", which is now commonly used in Europe in the passive restoration of species-rich seminatural grassland both on former arable land and former intensive grassland[4] are required. In order to monitor the progress of the Development of the habitat, approximately 10 -15 2m X 2m permanent quadrats will be established within the Proposed grassland area (with pre-works relevés established) and these quadrats will be monitored on an annual basis in May/June recording the cover and abundance of all species present and photographing each quadrat from a fixed point for a minimum of five years post construction. This monitoring will permit the degree of success of the habitat restoration to be assessed, informing the management of the habitat as to whether additional measures are required.

7.8.1.4 Habitat Restoration Management Plan

A monitoring regime must be implemented in order to assess the success of the management of the habitat restoration, and to iteratively alter the management if required (for example the use of green hay if necessary). Monitoring will include (but may not be limited to):

Monitoring the Development of the habitats within area of the solar farm, primarily. In compliance with the Habitat and Biodiversity Management Plan (see section 7.8.2.1).

[4] Wagner M, Hulmes S, Hulmes L, Redhead J, Nowakowski M and Pywell R (2020). Gren Hay transfer for grassland restoration: species capture and establishment. *Restoration Ecology*, **9.**

7.8.2 Operational Phase

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During the Operational Phase of the Proposed Development the biodiversity resource present onsite should be closely monitored.

7.8.2.1 Habitat and Biodiversity Management and Conservation Plan

A Habitat and Biodiversity Management and Conservation Plan (HBMCP) with the aim of the protection, preservation, and management of natural ecosystems and their inhabitants should be drawn up and implemented for the purposes of Biodiversity Net Gain.

Protecting and Enhancing Biodiversity

The plan should outline specific actions to conserve and enhance biodiversity, including the protection of native species and habitats.

Guiding Sustainable Development

The HBMCP will ensure that Development projects and land use changes are undertaken in a way that minimizes biodiversity loss and promotes positive impacts.

Maintaining Ecosystem Function

The HBMCP will outline how onsite biodiversity is vital for providing essential ecosystem services like clean air and water.

Addressing Threats

The plan should identify and address threats to biodiversity, such as habitat loss, pollution, and climate change.

Facilitating Effective Management

The HBMCP provides a framework for managing resources, implementing conservation actions, and monitoring progress.

Improving Resilience to Climate Change

Biodiversity plays a crucial role in adapting to climate change, and a plan can help enhance the resilience of ecosystem.

Promoting Environmental Awareness and Education

The plan could be used to educate the public about the aspirations of the Development in terms of biodiversity and the need for conservation.

7.8.2.2 Grassland Management within the Solar Farm

Conditions onsite at present indicate that species diversity within the grasslands is quite low. Once the Solar Farm has been installed it is predicted that a change in management from intensive agriculture will enhance species diversity. For the first three years post construction of the Solar Farm, it is recommended that the grasslands are cut twice a year in early April and in late September. All cuttings must be removed from the grassland. This management regime will over time reduce the nutrient levels in the soil allowing the establishment of a far greater flora. A HBMCP will outline all methods involved with the management of the grassland including future monitoring.

7.8.2.3 Details of the Rewilding

The Proposed Development includes areas for rewilding, these areas will remain undisturbed and unmanaged during the operational lifetime of the Development. Much of the habitats identified as rewilding areas are in publicly inaccessible areas and access should remain restricted. Generally, they are characterized by dense Bracken and scrub on steep slopes. The site is already used recreationally by people walking their dogs. It would be recommended to fence off rewilding areas to minimize disturbance from human and dog activity. Hard standing paths adjacent to these habitats will be avoided.

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7.9 Residual Impacts

7.9.1 Construction Phase

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Table 7-20 Summary of Residual Construction Phase Impacts

Ecological receptor	Ecological Valuation	Potential Impact (pre-mitigation and monitoring	Potential significance	Significant Residual Impact (Post-Mitigation and Monitoring)
Lower River Suir SAC	International Importance	Habitat Degradation (Hydrology, Non-Native Invasive Plant Species)	Likely significant effect on at the international geographic scale	Temporary, neutral, non-significant
Lower River Suir pNHA	National Importance	Habitat Degradation (Hydrology, Non-Native Invasive Plant Species)	Unlikely effect at any geographic scale	Temporary, neutral, non-significant
Portlaw Woods pNHA	National Importance	Habitat Degradation (Hydrology, Non-Native Invasive Plant Species)	Unlikely effect at any geographic scale	Temporary, neutral, non-significant
Habitats (outside designated areas for nature conservation)				
Depositing Lowland River (FW2) Whelan's Bridge River and tributary	Local Importance (Higher Value)	Habitat Degradation (Hydrology)	Likely significant effect at a local geographic scale	Temporary, neutral, non-significant
Wet Woodland (WN6)	Local Importance (Higher Value)	Habitat Degradation (Hydrology)	Likely significant effect at a local geographic scale	Temporary, neutral, non-significant
Fauna Species				
Bats	International Importance	Habitat loss, habitat fragmentation, Displacement, Disturbance	Likely significant effect at a international geographic scale	Temporary, negative, non-significant

Following the implementation of the mitigation measures outlined in Section 7.5, the Proposed Development will not result in any significant residual effects above the local scale on the KERs identified (see Table 7-16) on their own, or cumulatively together with other Proposed Developments during the Construction Phase.

7.9.2 7.6.3 Operational Phase

Following the implementation of the mitigation measures outlined in Section 7.5, the Proposed Development will not result in any significant residual effects on the KERs identified (Table 7-16) on their own, or cumulatively together with other Proposed Developments during the Operational Phase.

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Table 7-21 Summary of Residual Operational Phase Impacts

Ecological receptor	Ecological Valuation	Potential Impact (pre-mitigation and monitoring	Potential significance	Significant Residual Impact (Post-Mitigation and Monitoring
Lower River Suir SAC	International Importance	Habitat Degradation (Hydrology, Non-Native Invasive Plant Species)	Unlikely effect at any geographic scale	Neutral, temporary, non-significant.
Lower River Suir pNHA	National Importance	Habitat Degradation (Hydrology, Non-Native Invasive Plant Species)	Unlikely effect at any geographic scale	Neutral, temporary, non-significant.
Portlaw Woods pNHA	National Importance	Habitat Degradation (Hydrology, Non-Native Invasive Plant Species)	Unlikely effect at any geographic scale	Neutral, temporary, non-significant.
Habitats (outside designated areas for nature conservation)				
Depositing Lowland River (FW2) Whelan's Bridge River and tributary	Local Importance (Higher Value)	Habitat Degradation (Hydrology)	Likely significant effect at a local geographic scale	Neutral, temporary, non-significant.
Wet Woodland (WN6)	Local Importance (Higher Value)	Habitat Degradation (Hydrology)	Likely significant effect at a local geographic scale	Neutral, temporary, non-significant.
Fauna Species				
Bats	Local Importance (Higher value)	Habitat loss, habitat fragmentation, Displacement, Disturbance	Likely significant effect at a local to international geographic scale	Neutral - slight positive, non-significant

7.10 Cumulative Impacts of the Proposed Development

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Cumulative impacts can be defined as impacts on Natura 2000 sites that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the plan/project being assessed.

7.10.1 Construction Phase

Article 6(3) of the Habitats Directive requires an assessment of a plan/project to consider other plans/projects that might, in combination with the Proposed plan/project, have the potential to adversely impact upon Natura 2000 sites. Table 7-22 describe the main threats, pressures and activities as outlined in NPWS (2018) for the Lower River Suir SAC.

Identification of plans/projects which might act in combination is informed by identified threats to the structure and function of each site. Plans/projects which might act in combination are outlined in Chapter 2 Appendix 2.1.

Table 7-22 Lower River Suir SAC threats, pressures and activities with impacts on the site.

Code	Description	Inside/ Outside	Rank
A08	Agriculture - Fertilization	O	H
E01	Urbanization, residential and commercial Development - Urbanized areas, human habitation	B	H
E03	Urbanization, residential and commercial Development - Discharges	B	H
H01	Pollution - Pollution to surface waters (limnic, terrestrial, marine & brackish)	B	H
J02.12.02	Natural System modifications - human induced changes in hydraulic conditions - Dykes, embankments, artificial beaches, general - dykes and flooding defence in inland water systems	I	H
J02.01	Natural System modifications - human induced changes in hydraulic conditions - Landfill, land reclamation and drying out, general	B	M
A01	Agriculture - Cultivation	I	L
B	Sylviculture, forestry	O	L
D03.01	Transportation and service corridors - shipping lanes, ports, marine constructions - port areas	B	L
I01	Invasive, other problematic species and genes - invasive non-native species	I	L
J02.01.02	Natural System modifications - human induced changes in hydraulic conditions - Landfill, land reclamation and drying out, general - reclamation of land from sea, estuary or marsh	I	L

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Table 7-23 Potential cumulative impacts.

Plan	Purpose	Cumulative Impact
EU Water framework Directive	Maintain and enhance water quality within the EU	None predicted
EU Freshwater Fish Directive	Protect freshwater bodies within the EU suitable for sustaining fish populations	None predicted
EU Groundwater Directive	Maintain and enhance the quality of groundwater within the EU	None predicted
EU Floods Directive	The Floods Directive applies to river basins and coastal areas at risk of flooding	None predicted
Nitrates Directive	Reducing water pollution within the EU	None predicted
Urban Waste-water treatment Directive	Protecting the environment from adverse impacts of waste-water discharge	None predicted
Sewage Sludge Directive	Regulate the use of sewage sludge	None predicted
The IPPC Directive	To achieve a high level of environmental protection	None predicted
National Development Plan	To promote more balanced spatial and economic Development	None predicted
National Spatial Strategy	To achieve a better balance of social, economic, and physical Development across Ireland	None predicted
Forestry Programme 2023-2027	Promoting economic, social and environmentally sustainable farming, fishing and forestry.	None predicted
Waterford City & County Development Plan 2022-2028	Sets out policies and objectives for proper planning and sustainable Development of the county.	None predicted
Local Area Development Plans	Various	None predicted
Quarrying activities, water abstraction, discharge, etc	Various	Potential in-combination impacts on water quality
Current and future planning permissions –	Various	An Appropriate Assessment Screening exercise of any planning permission would be undertaken.
Part 8's	Various	An Appropriate Assessment Screening exercise of any Part 8 would be undertaken
Land spreading of organic waste by farmers in the locality	Fertilising land, disposing of organic waste	Potential in-combination impacts on water quality
Adjacent forestry operations	Various – afforestation, thinning, harvesting, road building, etc	Potential in-combination impacts on water quality
Nitrates Action Programmes	Prevent pollution of waters from agricultural sources and to protect and improve water quality.	Non predicted

7.10.1.1 Identification of Potential cumulative impacts in association with other plans or projects

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Cumulative impacts can be defined as impacts on Natura 2000 sites that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the plan/project being assessed.

Article 6(3) of the Habitats Directive requires an assessment of a plan/project to consider other plans/projects that might, in combination with the proposed plan/project, have the potential to adversely impact upon Natura 2000 sites. Table 7-22, Table 7-24 and Table 7-25 below describe the main threats, pressures and activities as outlined in NPWS (2018a) for the Lower River Suir SAC. (Please note, O refers to outside site, I refers to within site, B refers to both inside and outside site with H, M and L referring the High, Medium and Low respectively)

Identification of plans/projects which might act in combination is informed by identified threats to the structure and function of each site.

Table 7-24 Lower River Suir SAC threats, pressures and activities with impacts on the site.

CODE	DESCRIPTION	INSIDE/ OUTSIDE	RANK
A08	Agriculture - Fertilisation	O	H
E01	Urbanisation, residential and commercial development - Urbanised areas, human habitation	B	H
E03	Urbanisation, residential and commercial development - Discharges	B	H
H01	Pollution - Pollution to surface waters (limnic, terrestrial, marine & brackish)	B	H
J02.12.02	Natural System modifications - human induced changes in hydraulic conditions - Dykes, embankments, artificial beaches, general - dykes and flooding defence in inland water systems	I	H
J02.01	Natural System modifications - human induced changes in hydraulic conditions - Landfill, land reclamation and drying out, general	B	M
A01	Agriculture - Cultivation	I	L
B	Sylviculture, forestry	O	L
D03.01	Transportation and service corridors - shipping lanes, ports, marine constructions - port areas	B	L
I01	Invasive, other problematic species and genes - invasive non-native species	I	L
J02.01.02	Natural System modifications - human induced changes in hydraulic conditions - Landfill, land reclamation and drying out, general - reclamation of land from sea, estuary or marsh	I	L

The primary threats, pressures and activities with impacts on the Natura 2000 sites examined (with High Ranking) are Agriculture, Urbanization/Human disturbances, Pollution and Natural System modification (primarily modifications in hydrology).

All identified potential likely impacts are associated with impacts to water/hydrology/hydrology. The cumulative impact of the proposed development with any/all relevant other planned or permitted developments with regard to hydrology/hydrogeology are examined comprehensively in Chapter 6 of the EIAR, excerpts from which are presented as follows:

"…Existing developments that are already built and in operation contribute to the characterization of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the proposed development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

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- ***Construction Phase***

In relation to the potential cumulative impact on hydrology and hydrogeology during the construction phase, the construction works which would have potential cumulative impacts are as follows:

Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.

Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.

Contamination of surface water and groundwater from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect surface water and groundwater quality in compliance with legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

The implementation of mitigation and monitoring measures previously detailed above in section 6.6.1 and 6.7.1 as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the construction phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** *and* ***short-term****.*

- ***Operational Phase***

In relation to the potential cumulative impact on hydrology and hydrogeology during the operational phase, the operational activities which would have potential cumulative impacts are as follows:

Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the site. Cumulatively this development and others in the area will result in localized reduced recharge to ground and increase in surface run-off.

Increased risk of accidental discharge of hydrocarbons from car parking areas, and along roads is possible unless diverted to surface water system with petrol interceptor.

There will be a small loss of greenfield area locally as part of the proposed development.

Each specialist has considered the list of relevant planning permissions from the surrounding areas of the proposed development as presented in Chapter 2 – Description of Proposed Development - Appendix 2.1. The proposed development and other permitted developments will result in an increase in hard standing which will result in localized reduced recharge to ground.

The proposed development site is underlain by a "Regionally Important Aquifer – Fissured Bedrock". There is no potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the natural recharge capacity of the underlying aquifer which allows for the maintenance of groundwater levels.

The implementation of SuDs measures on site will mitigate against and reduce the recharge rate to ground.

All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

The implementation of mitigation and monitoring measures previously detailed above in section 6.6.2 and 6.7.2 as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the operational phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** *and* ***short-term****…"*

The primary source of any cumulative impacts concerns impacts on water quality. The proposed development is located within the Suir surface water catchment and the Dawn [River]_SC_010 sub-catchment.

The Suir catchment includes the area drained by the River Suir and all streams entering tidal water between Drumdowney and Cheekpoint, Co. Waterford, draining a total area of 3,542km² (EPA, 2024). The largest urban center in the catchment is Waterford City. The other main urban centers in this catchment are Carrick-on-Suir, Clonmel, Caher, Thurles, Tipperary, Fethard and Templemore. The Suir catchment is divided into 29 subcatchments and has 179 surface water bodies and 43 groundwaterbodies. There are nine waterbodies with a High Ecological Status Objective (HSO) in the Suir Catchment, with seven currently not meeting their environmental objective of High (EPA, 2024). A total of 112 (50%) waterbodies are At Risk of not meeting their environmental objective in the Suir Catchment, while 41 (18%) are under Review and 69 (31%) are Not At Risk. EPA Q-values for stations proximate to the proposed development include:

- "WHELAN'S BRIDGE STREAM - Br W of Carrickadustara" (Station code: RS16W010200) southeast (upstream) of proposed development along the Whelanbridge (River) – Q-value 3-4 "Moderate" (Year: 1988).
- "Whelan's Bridge" (Station code: RS16W010400) (c.0.9km downstream of the proposed development) along the Whelanbridge (River) – Q-value 3 "Poor" (Year: 2023).

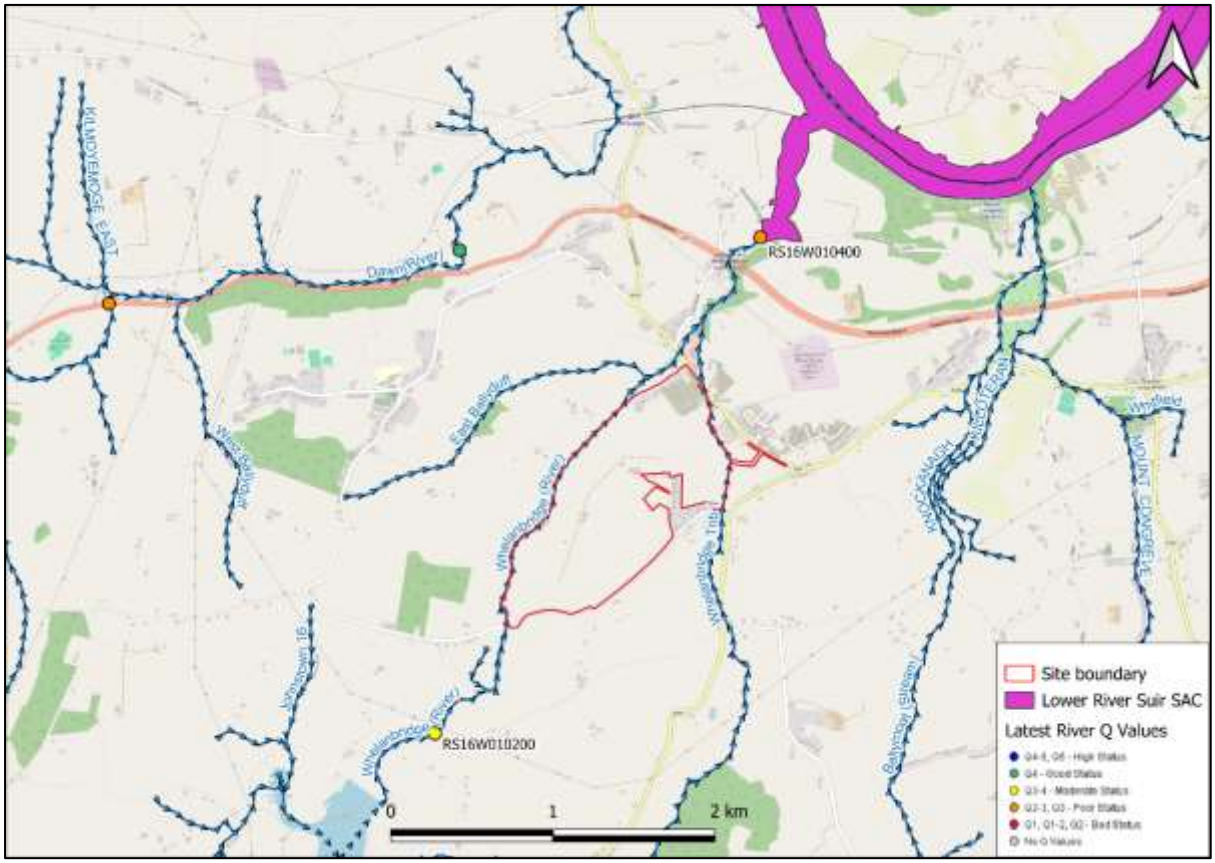
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EPA (2024) state that significant pressure affecting the majority of river water bodies in the catchment is agriculture followed by forestry, hydromorphological pressures, peat, urban run-off, urban wastewater, industry, mines and quarries, domestic wastewater, invasive species and abstractions. EPA (2018) state issues related to farming in this catchment are phosphorus loss to surface waters from, for example, direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment can also be a problem from land drainage works, bank erosion from animal access or stream crossings.

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Projects within the Dawn [River]_SC_010 sub-catchment have the potential for in-combination impacts on aquatic conservation objectives of the Lower River Suir SAC.

Figure 7-42 Latest EPA Q-vale scores proximate to the proposed development (1:25,000).



7.10.1.2 Planning application search

In order to identify projects with the potential for cumulative/in combination projects, a search of planning applications in the vicinity was undertaken. There are a number of granted planning permissions, and appealed planning permissions for residential or other small-scale developments in the immediate vicinity of the proposed development. A comprehensive list of these projects considered in the cumulative impacts assessment is presented in **Table** 7-25. These small-scale developments, by virtue of their scale, nature or distance from the proposed development, in light of the cumulative impacts as identified in the Hydrology/Hydrogeology Chapter of the EIAR, are not likely to have any significant cumulative/in combination impact on the Natura 2000 network.

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Table 7-25 Post January 2020 planning applications within the vicinity of the proposed development.

Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2027	(1) the construction of a single storey sunroom to the rear of the house (2) the alteration of window and door opes on the house which is a change from the previous planning permission P.D. 87/523 and (3) the construction of a garage along with all assoc	Lahardan , Portlaw , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	22/01/2020
2038	the erection of a farm gate to allow access to agricultural land and all associated site works	Whelans Bridge , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	29/01/2020
20114	to replace wing walls and entrance to achieve sight lines at farm entrance and to construct a cattle underpass beneath the public road L4410, adjacent to this farm entrance and together with associated site works	Mount Congreve & Knockanagh , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	27/02/2020
20187	retention of existing extension to the side of the house and planning permission to construct an extension and ancillary works, to the rear of the house at	Ballyshunnock , Kilmacthomas , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	24/03/2020
20209	to construct a storey and half dwelling house, installation of a wastewater treatment system and percolation area, new site entrance and associated site works at	Raheens , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	02/04/2020
20223	to raise field levels of existing agricultural lands using clean inert soil and stones (EU Waste Class 17 0504) in order to improve quality of said lands and an area to recycle construction materials	Ballycraddock , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	15/04/2020
20225	the construction of a new single storey side and rear extension, an amendment to the existing driveway entrance, the addition of one new rooflight to the front including all internal modifications to existing dwelling and all associated site works	Carrigadustra , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	16/04/2020

Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
20260	for change of use of part of the existing Stores Area at the rear of the building to Retail use including Off-Licence and the amalgamation of this area into the existing Supermarket, relocation of the Offices/Staff Facilities into the Stores Areas, alter	Centra , Kilmeaden Adamstown , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/05/2020
20316	for a concrete batch manufacturing facility consisting of the following; one concrete batching plant unit including a control cabin, four no. cement silos (to 15 metres in height), six no. storage bins, a reserve water tank, a truck wash out area with se	Greenan and Ballyshonock , Kilmacthomas , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	02/06/2020
20328	the retention of an agricultural shed, to demolish existing agricultural structures and construct a dairy, rotary milking parlour, holding yard, slatted tanks, cubicle shed, feed passages, calving shed, two silage silos and associated site works	Knockanagh , Kilmeaden , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	04/06/2020
20335	to remove existing cottage remains and to replace with single storey dwelling house, storage shed, entrance, wastewater treatment system, percolation area and all ancillary site works at	Ballygarran , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	08/06/2020
20400	to build 40 no. dwellinghouses, consisting of (i) 14 no. two storey, semi detached houses (ii) 16 no. two storey, terraced houses in two blocks and (iii) 10 no. two storey terraced houses in three blocks, with option of providing a third floor to any of	Adamstown , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	23/06/2020
20445	for construction of single storey extension to the side of the existing building and changes to front façade fenestration including new roof lights together with all additional site works at	Ashler , Ballyduff West , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/07/2020
20438	to construct a single storey dwelling, this is change of house design from that granted under PD10/409 and extended under PD16/22 and all ancillary site works at	Ballyshonock , Kilmacthomas , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/07/2020

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
20547	the conversion for use as part of the house of garage/store attached to SW side of existing house together with first floor storage space over garage with windows to SW and 2 no. rooflights to rear of house and all associated works	Carrickphilip , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	13/08/2020
20557	to construct a part single storey/part storey and a half dwelling and garage with site entrance, driveway and domestic waste water treatment plant and percolation area, a connection to the public water supply main and all ancillary and associated site wo	Carrickphilip , Kill , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	13/08/2020
20572	for the following works to my existing dwelling house comprising refurbishment and alterations to the existing dwelling house, conversion of the existing garage to a new utility room, boot room, and plant room, construction of 2 no. single storey extensi	Creamery House , Blackknock , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	19/08/2020
20593	the construction of a single-storey dwelling with detached garage, septic tank/wastewater treatment system and all associated site works	Caheruane , Kill , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	24/08/2020
20656	to construct a calf house / machinery shed and all associated ancillary site works	Lissahane , Kill , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	16/09/2020
20706	indefinite retention for as built modifications to previously approved dwelling (Planning Ref: 051215)	Ballycraddock , Kilmeaden , Co.Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	01/10/2020
20776	Retention Planning Permission to sought to retain as built detached domestic garage and boiler house to rear of existing dwelling and all associated ancillary works at	Coolfin , Portlaw , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	23/10/2020
20802	for a change of use from previous retail use (part of previous larger retail unit) to use as a full traditional fast food/hot food takeaway. Together with modifications in creating the floor plan layout, forming the entrance to the service area of the la	Unit 2 (part of) , of the Ground Floor , Kilmeaden Village Centre Adamstown	APPLICATION FINALISED	PERMISSION	CONDITIONAL	03/11/2020

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
20810	RETENTION to retain indefinitely auctioneering sales, rental and administration offices, together with PERMISSION for front and side elevational fascia signage	Unit 8 Kilmeaden Village Centre , Adamstown , Kilmeaden	APPLICATION FINALISED	RETENTION	CONDITIONAL	03/11/2020
20948	the construction of a new dormer bungalow, a new driveway entrance and the installation of a waste water treatment system with polishing filters and percolation area and all associated site works	Ballydurn , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	14/12/2020
2114	for the construction of a steel finished garden shed located in the northern corner of the site, along with connection to existing surface water drainage and all associated site works at	Adamstown , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	13/01/2021
2135	for the construction of a new extension to the rear of our existing Public House comprising the construction of a new single storey residential accommodation to the rear (south) of the existing Public House together with connection to the existing on-sit	Haughtons's Public House , Ross , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	22/01/2021
21167	indefinite retention of the following works to my existing dwelling house comprising minor internal refurbishment and alteration work, permission for the construction of a new double door to the West (Side) elevation, the construction of a single storey	Ballyduff West , Kilmeaden , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	05/03/2021
21199	two-storey extension to the side of my existing dwelling together with connection to on site services and all associated site works	Ballyduff , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	12/03/2021
21214	for the construction of 96 no. dwelling units incorporating 10 no. 2 storey 4 bed detached units (Type A) 32 No. 2 storey semi detached 4 bed units (Type 8), 28 No. 2 storey semi detached 3 bed units (Type C), 10 no. 2 storey semi detached 3 bed units (T	Adamstown , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	16/03/2021

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
21240	to construct a livestock shed containing a straw bedded area, feed passage, covering an existing U/G slatted tank and associated site works with the development at	Lahardan , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	24/03/2021
21304	for the indefinite retention permission of the following works to existing dwelling house comprising the construction of a new sunroom to the front (north west) of the existing dwelling house and the construction of a standalone single storey garage, tog	Woodbrook House , Raheens , Kilmeaden	APPLICATION FINALISED	RETENTION	CONDITIONAL	14/04/2021
21324	to alter the footprint of the house plan from that granted planning permission under reference 20/335 and ancillary works at	Ballygarran , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	19/04/2021
21351	change of site boundaries from those granted planning permission under reference 20/948 and ancillary works at	Ballydurn , Kilmacthomas , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	28/04/2021
21416	for a new single storey extension to the side and rear of existing house and all associated site works at	22 Fan Glas , Adamstown , Kilmeaden Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	13/05/2021
21509	the following works to existing dwelling house, the de-commissioning of existing septic tank and percolation area, together with the construction, installation and re-location of a new packaged waste water treatment system and percolation area to serve e	The Pines , Ballyduff East , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	03/06/2021
21512	sub division of the existing site boundary to incorporate the existing garage and exiting site entrance (prev. granted under pl. perm. ref. no. 98/39) and extension of existing site boundary to the south together with the construction of a new storey and	Ballyduff East , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	03/06/2021

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
21581	Decommission existing septic tank, connect existing dwelling to the public drainage system, construct a new single storey dwelling, and all ancillary site works	Adamstown , Kilmeaden , Co. Waterford	APPLICATION FINALISED	OUTLINE PERMISSION	CONDITIONAL	21/06/2021
21618	Construct single storey extensions to existing single storey house and associated works	Ballygarran , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	28/06/2021
21663	Erect deli kitchen/store extension and all associated works	Gala Express Filling Station , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	09/07/2021
21797	Section 254 Licence Application - The erection of overground electronic communications infrastructure and any associated physical infrastructure along public roads including:- 1. The erection of new overground fibre optic cables on existing timber poles	Comeragh MD , Municipal District	APPLICATION FINALISED	PERMISSION	CONDITIONAL	23/08/2021
21845	for the refurbishment of the existing cottage including raising the roof to allow a storey and a half, the addition of gable windows and rooflights to the front, elevational changes to the front faÃ§ade, the construction of a rear storey and a half exten	Carrolls Cross , Kilmacthomas , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	02/09/2021
21886	for (a) permission and (b) retention for (i) retention permission for a period of three years for a single storey welfare facilities building located to the west of the existing building (ii) indefinite retention permission for a single storey plantroom	Carrolls Cross , Kilmacthomas , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	16/09/2021
21895	to construct a single storey dwelling, garage, waste water treatment system, percolation area, splayed entrance and all ancillary site works at	Crinalisk , Kill , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	22/09/2021
21908	Converting Broadleaf High Forest to Mixed High Forest (removal of diseased ash forest and replacement with a mixture of broadleaf and conifer species)	Johnstown , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	29/09/2021

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
21923	Planning Permission consequent on the grant of outline planning permission to decommission existing septic tank, connect existing dwelling to the public drainage system, construct a new single storey dwelling, connect to public drainage system, new entra	Adamstown , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	04/10/2021
21942	EXTENSION OF DURATION of 16/578 to construct a cattle underpass beneath the public road adjacent to the farmyard	Carrickadustra , Kilmeaden , Co. Waterford	APPLICATION FINALISED	EXTENSION OF DURATION	CONDITIONAL	11/10/2021
21967	for the construction of a new single storey dwelling house, new single storey garage, new bored well, together with a new waste water treatment system and percolation area together with all ancillary and associated site works, at	Carrickphilip , Kill , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	15/10/2021
211054	to RETAIN a cattle underpass beneath farm access driveway and construct safety barriers and ancillary site works, including screen and amenity planting. The proposed development is to be accessed via the existing farm driveway	Mount Congreve Farm , Knockanagh , Kilmeaden	APPLICATION FINALISED	RETENTION	CONDITIONAL	12/11/2021
211067	SECTION 254 LICENCE for the erection of overground electronic communications infrastructure and any associated physical infrastructure along public roads including: 1. The erection of new overground fibre optic cables on existing timber poles. 2. The er	Comeragh MD ,	APPLICATION FINALISED	PERMISSION	CONDITIONAL	17/11/2021
211102	INDEFINITE RETENTION PERMISSION of the existing standalone single storey garage. PLANNING PERMISSION for the following works to existing dwelling house, comprising the construction of a new single storey extension to the rear (west) elevation, the const	Carriganure , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	26/11/2021
211108	the construction of a new single storey house with an attached garage, a wastewater treatment system, a bored well and an entrance along with all associated site works	Ballygarron , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	29/11/2021

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
211109	construct cubicles shed with loose area and underground effluent tanks and all associated site works	Kilmoyemoge West , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	30/11/2021
211126	Planning Permission is being sought to construct new single-storey dwelling, single-storey garage, upgrading of existing entrance, new waste water treatment system and percolation area and all associated site works	Crinalisk , Kill , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	03/12/2021
211134	Planning permission is required for construction of a new single storey dwelling, site entrance, wastewater treatment system and percolation area and all ancillary site works	Hacketstown , Portlaw , Co. Waterford.	APPLICATION FINALISED	PERMISSION	CONDITIONAL	08/12/2021
211218	the construction of a new dwelling, a new driveway entrance and the installation of a wastewater treatment system with polishing filters and percolation area and all associated site works	Ballydurn , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	22/12/2021
211216	the construction of a new two storey split level dwelling house with new single storey carport, new bored well, together with a new waste water treatment system and percolation area together with all ancillary and associated site works	Stonehouse , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	22/12/2021
211223	construct a single-storey dwelling and garage, together with landscaping, sewage treatment plant and percolation area, borehole, driveway and ancillary site works. The proposed development will be accessed via the existing farm entrance	Mount Congreve Farm , Knockanagh , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	23/12/2021
224	erect a two-storey home, garage, driveway entrance, waste water treatment system, percolation area, borewell, landscaping and all associated site works	Grenan , Kill , Kilmacthomas	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/01/2022
228	demolish existing dwelling house and build new dwelling, sewage treatment system and all ancillary works	Ballyrobin , Kill , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	11/01/2022

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
22134	INDEFINITE RETENTION of conversion of attic space as well as extension to dwelling house and storage sheds. PLANNING PERMISSION for garage and all ancillary works	Blackknock , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	23/02/2022
22163	demolish existing dormer dwelling, to decommission existing septic tank, to construct a replacement dwelling which is to be a dormer style dwelling, wastewater treatment system, percolation area, alterations to existing entrance from public road to impro	Greenan , Kilmacthomas , County Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	03/03/2022
22178	the Restoration of a disused rock and gravel quarry comprising some 3.26 hectares to agricultural use using imported inert soil and stone classified as Article 27 by-products of the construction industry. It is proposed to import some 270,000m3 of that	Powersknock , Kilmeaden , County Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	10/03/2022
22215	retention of a garage and the construction of a granny flat and shared lobby; the granny flat is to be accessed through the shared lobby and garage	Ballycahane , Portlaw , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	16/03/2022
22295	the following works to our existing GAA Club, the widening and enlarging of the existing vehicular entrance and access road way, the erection of new fencing to both sides of the new widened access roadway, the conversion of the existing dressing rooms to	Kildermody , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	12/04/2022
22309	construct a single storey dwelling, garage, wastewater treatment system, percolation area, splayed entrance and all ancillary site works	Ballygarran , Kilmeaden , County Waterford	APPLICATION FINALISED	OUTLINE PERMISSION	CONDITIONAL	13/04/2022
22475	of the construction of a site entrance constructed with stone walling and wrought iron gates and ancillary site works	Knockaderry Lodge , Johnstown , Kilmeaden	APPLICATION FINALISED	RETENTION	CONDITIONAL	02/06/2022
22499	of a freestanding steel shed to the rear of the dwelling	Marlfield , Carrickphillip , Kill	APPLICATION FINALISED	RETENTION	CONDITIONAL	03/06/2022

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
22507	the demolition of 2 no. existing habitable dwellinghouses and existing farm buildings comprising of haybarn, walker, lunge ring and stables. PLANNING PERMISSION is sought for the construction of 67 No. 2 storey dwelling units consisting of; 11 No. detac	Adamstown , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	09/06/2022
22535	for the garage as constructed along with all associated site works	'Lynsey Lodge' , Carrickphilip , KillKilmacthomas	APPLICATION FINALISED	RETENTION	CONDITIONAL	17/06/2022
22536	RETENTION PERMISSION for (1) the temporary placement of a mobile home on site (2) the erection of a shed and (3) ground works consisting of an entrance to the public road, a driveway and parking area. PLANNING PERMISSION for (1) the construction of a ne	Carrickphilip , Kill , Kilmacthomas	APPLICATION FINALISED	RETENTION	CONDITIONAL	17/06/2022
22573	the existing construction works to existing dwelling house, comprising the single storey ground floor extension to the front (North) side and the new dormer window at first floor level (West) side to the existing dwelling house and all connected to the e	Blackknock , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	27/06/2022
22615	for the development of a single-storey dwelling, garage, driveway entrance, wastewater treatment system, percolation area, well, landscaping and all associated site works	Lissahane , Kill , Co.Waterford	APPLICATION FINALISED	OUTLINE PERMISSION	CONDITIONAL	07/07/2022
22613	for erection of a dwelling house, sewage treatment system and all ancillary works.	Coolfin , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/07/2022
22666	for the demolition of the existing rear extension and for the construction of a new replacement rear extension and to include all associated and ancillary site works	Carrickadustra , Kilmeaden , Co Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	25/07/2022
22696	to construct a single storey extension to the side of the dwelling and all ancillary site works	Georgestown , Kill , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	05/08/2022

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
22737	a slatted tank/holding yard, meal bin and extension to an existing milking parlour and calf shed granted under PP 16/578 and planning permission to install a solar photovoltaic (PV) renewal electricity generation system on the farm comprising of 150 grou	Carrickadustra , Raheens , Kilmeaden	APPLICATION FINALISED	RETENTION	CONDITIONAL	22/08/2022
22766	to construct a single storey dwelling, garage, wastewater treatment system, percolation area, splayed entrance and all ancillary site works	Ballygarran , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION CONSEQUENT	CONDITIONAL	30/08/2022
22808	for change of use from stables to a dwelling house together with planning permission for sub-division of the site, waste water treatment plant and percolation area, soakaway, shared entrance, connection to mains water and all associated site works	Ballyduff , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	13/09/2022
22811	for single storey family dwelling together with detached garage, waste water treatment plant and percolation area, soakaway, boundary treatment, new entrance, connection to public services and all associated site works	Amberhill , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	14/09/2022
22821	to extend existing dwelling house with single storey separate living unit, entrance, upgrade existing septic tank system to wastewater treatment system and ancillary works	Carrigeen , Newtown , Kilmacthomas	APPLICATION FINALISED	PERMISSION	CONDITIONAL	21/09/2022
22988	the refurbishment and extension to an existing dwelling house and outbuildings including limited demolition, restoration and adaptation of existing structures, new wastewater treatment system and other ancillary site works	Kilmagemogue , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	23/11/2022
221006	Outline planning permission to construct a dormer style dwelling, garage, waste-water treatment system, percolation area, splayed entrance & all ancillary works	Ballyduff East , Kilmeaden , Co. Waterford	APPLICATION FINALISED	OUTLINE PERMISSION	CONDITIONAL	01/12/2022

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2260010	Planning Permission to construct a dormer dwelling with attached carport and domestic garage, on site sewerage treatment, new entrance onto the public road and all associated works	Lissahane , Kill , Co.Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	20/12/2022
2322	To demolish a calf house and to construct a calf house and ancillary works	Kilmoyemoge West , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	25/01/2023
2354	To Retain extension to existing slatted cubicle shed, planning permission to construct a slatted cubicle shed, associated slurry storage tanks and all ancillary site works	Lissahane , Kill , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	15/02/2023
2355	Retention of alterations to development granted under PP File Ref. 071061, consisting of a slatted tank, cubicle beds and 2 no. scraped passageways	Coolagadden , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	16/02/2023
2360057	for proposed new single-story dwelling house with detached garage, including new on-site proprietary wastewater treatment system and percolation area, new vehicular entrance and all associated groundworks and landscaping	Stonehouse , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	17/02/2023
2360073	for single storey dwelling house and detached garage, proprietary waste water treatment system and percolation area and decommissioning of existing septic tank, demolition of part outbuilding on site, together with all associated site development works	Hacketstown , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	28/02/2023
2360082	Planning permission for the construction of a garage along with all associated site works at Ballyshunnock, Kilmacthomas, Co. Waterford.	Ballyshunnock , Kilmacthomas , Co. Waterford.	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/03/2023
2360099	construction of a one-and-a-half story dwelling and garage, upgrading the existing entrance, new wastewater treatment system and percolation area together with all associated site work.	Crinalisk , Kill , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	19/03/2023

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2360115	construction of an agricultural cubicle shed, slatted tank & feed passage. This shed is proposed to also cover the existing cubicle area & feed passage.	Coolagaddden , KIlmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	30/03/2023
23114	to construct a single storey extension to existing dwelling and all associated site works	Penrose Cottage , Ballyduff , Kilmeaden	APPLICATION FINALISED	PERMISSION	CONDITIONAL	06/04/2023
23137	permission consequent on the grant of outline planning permission to construct a dormer style dwelling, garage, wastewater treatment system, percolation area, splayed entrance and all ancillary site works. Outline planning permission granted under planni	Ballyduff East , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION CONSEQUENT	CONDITIONAL	25/04/2023
2360208	an extension to the North Eastern side of the house in accordance with the drawings submitted	Ballylenane , Dunhill , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	22/05/2023
2360242	for renovation of existing derelict dwelling house, including extension and alterations, including all necessary site works.	Ballyshonock , Kilmacthomas , Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	11/06/2023
2360250	construction of a calf shed, an extension to existing cubicle shed to contain a new slatted tank and all associated site works	Kilmovee , Portlaw , Co. Waterford.	APPLICATION FINALISED	PERMISSION	CONDITIONAL	15/06/2023
2360277	for the restoration of part of an exhausted quarry void located within the former rock quarry at Carrollâ€™s Cross in the townland(s) of Greenan and Ballyshanock. The application area will be ca. 4.7 hectares and the void which will be subjected to resto	Former Roadstone Carrolls Cross Quarry , Greenan and Ballyshanock , Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	27/06/2023
23220	for indefinite retention of as built single storey garage and fuel store and associated works	Coolfin , Portlaw , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	12/07/2023
2360301	demolition of an existing two storey dwelling and construction of a new two storey dwelling, driveway, wastewater treatment plant & percolation area, landscaping and all ancillary site works	Kilmoyemoge West , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	13/07/2023

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
23223	for the construction of a new dormer dwelling house, new single storey garage, new bored well, together with a new packaged waste water treatment system and partially raised polishing filter percolation area together with all ancillary and associated sit	Ballyvadd , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	18/07/2023
23244	to construct a two storey dwelling, wastewater treatment system, percolation area, splayed entrance and all ancillary site works	Ballyhussa , Kilmacthomas , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	15/08/2023
23252	for sunroom extension to the side of dwelling, garage as constructed, alterations to the site boundaries from that granted under PD 01/1129 and all ancillary site works	Ballyshonock , Kilmacthomas , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	24/08/2023
2360390	to retain indefinitely sit down area and all associated works	DJH Forecourt Ltd , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	29/08/2023
23254	for the construction of a new two storey extension to the existing dressing room block, comprising of the following; 2 no dressing rooms, showers and toilet facilities, meeting room and gym, together with all ancillary and associated accommodations, all	Ballyduff West , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	31/08/2023
2360429	new bungalow (3bed 4/5 person), garage, waste treatment system, percolation area, landscaping, site entrance, with temporary siting of a mobile home for the duration of the build and all site development and associated works and connections	Carrigeen , Newtown , Kilmacthomas Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	16/09/2023
2360486	Complete renovation of existing dwelling, including extensions to side and rear, new roof, new windows and doors, new vehicular entrance, replacement of waste water treatment system and new percolation area together with all associated site works.	Ballycraddock , Kilmeaden , Co. Waterford.	APPLICATION FINALISED	PERMISSION	CONDITIONAL	16/10/2023

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2360528	to subdivide existing site to create a new development site. Permission includes for construction of new 2.1m high Dividing wall, a new vehicular entrance on the public road and permission to construct a 1.5 storey dwelling house along with associated si	Ballyduff West , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	06/11/2023
23329	change of house type from that granted under planning permission 22/613	Coolfinn , Portlaw , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	30/11/2023
243	to construct a dormer style dwelling, garage, wastewater treatment system, percolation area, splayed entrance and all ancillary site works	Ballyhussa , Kilmacthomas , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	04/01/2024
2414	to construct a new single storey dwelling, bio-crete waste water treatment unit, 45m2 polishing filter, recessed entrance and all associated site works	Carrickphilip , Kill , Co. Waterford	DECISION MADE	PERMISSION	CONDITIONAL	22/01/2024
2462	for the following works, comprising the construction of a new sensory garden area with associated fencing and access path to the side (east) of the existing school, together with all ancillary and associated site works	Ballyduff West , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	28/03/2024
2460163	for development of a 800MWh Battery Energy Storage Systems facility within a total site area of 5.45 hectares. The site will include 40No. Electrical Inverters, 20No. Electrical Transformers, 103No. Containerised Battery Storage Modules on Concrete Plint	Townlands of Glenhouse and Lahardan Co. Waterford , on a site approximately 15 kilometers , West of Waterford City.	APPLICATION FINALISED	PERMISSION	CONDITIONAL	05/04/2024
2460175	to construct a livestock calf shed, remove an existing round roof shed with lean-to and construct a livestock shed containing cubicles, feed passage and associated site works	Carrickphilip , Kill Kilmacthomas , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	10/04/2024

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2460316	for an existing store and PERMISSION for the removal of existing stores and office, the construction of an extension to the existing train shed to include toilet facilities and associated track work, service pit, water towers, coal bunker and ash pit al	Kilmeaden Station , Kilmeaden , Co Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	07/06/2024
24123	for development consisting of the construction of a new extension to an existing single storey house, which includes a new roof, three dormer windows to the front of the house, and extension to the rear on the ground and first floor. Refurbishment of the	Ballyduff West , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	07/06/2024
24131	change of design for the refurbishment and extension to an existing dwellinghouse and outbuildings, including limited demolition, restoration and adaptation of existing structures, granted permission under PD22/988 and all associated ancillary site works	Kilmagemogue , Kilmeaden , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	18/06/2024
24137	Change of use of part of the building from Cold Storage presently to that of a Packaging/Processing Area. Permission to demolish the existing Inspection Room and Canteen to be replaced by a new Canteen & Amenities building, to partition off the packagin	QK Coldstores LTD. , Carrolls Cross , Ballyshunnock Kilmacthomas	APPLICATION FINALISED	PERMISSION	CONDITIONAL	26/06/2024
2460408	for the indefinite retention of a first-floor extension and elevational alterations to a permitted garage (under PD Ref:07-12), together with change of use to home office, and all associated site development works	Kilmovee , Portlaw , Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	18/07/2024
24167	the Indefinite Retention Permission of the existing construction works to the existing workshop, comprising the following: the construction of a new extension and boiler house to the east side, the relocation of a door to the west side and minor elevatio	Amberhill , Kilmeaden , Co. Waterford	APPLICATION FINALISED	RETENTION	CONDITIONAL	19/07/2024

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2460431	the demolition of the existing rear extension and for the renovation and refurbishment of the original dwelling and for the construction of single storey and storey and a half type extensions to same, and including all ancillary and associated site works	KNOCKHOUSE , PORTLAW , CO. WATERFORD	FURTHER INFORMATION	PERMISSION	N/A	29/07/2024
2460442	The construction of a calf shed, and to carry out all ancillary siteworks	Balyvadd , Portlaw , Co. Waterford	APPEALED	PERMISSION	CONDITIONAL	01/08/2024
2460450	: alterations to north elevation windows; new timber roof window to replace leaking PVC roof window; four new windows to North elevation; modification of the existing ramps to be replaced with new landing, stairs and railings; new replacement timber exte	Pouldrew House , Portlaw , Co. Waterford	NEW APPLICATION	PERMISSION	N/A	07/08/2024
2460512	the renovation and extension of an existing vacant and derelict dwelling, bringing the dwelling up to modern living standards, and providing further accommodation including living spaces, additional bedrooms, a garden room/gym area, a new wastewater trea	Robertstown , Newtown , Co. Waterford	APPLICATION FINALISED	PERMISSION	CONDITIONAL	10/09/2024
2460564	the construction of a single storey extension and all other ancillary site works	KILMOYEMOGE WEST , PORTLAW , CO. WATERFORD	APPLICATION FINALISED	PERMISSION	CONDITIONAL	26/09/2024
2460590	for the following (i) Demolition of 3 No. existing single storey commercial garage units (644sqm) currently addressing the R680 (ii) reconfiguration of TirlÃin CountryLifeâ€™s front boundary including the provision of a new site entrance onto the R680 to	TirlÃin Countrylife , Kilmeaden , Co. Waterford	FURTHER INFORMATION	PERMISSION	N/A	07/10/2024
2460616	for changes to houses types and all associated site works, from that granted under planning reg. no 21/214 (and subsequently granted relocation under 22/507) on sites 13-20 and 21-28 .Works comprise the erection of 7no bungalows comprising of 2no 3 unit	sites 13-20 and 21-28 ClochÃin , Adamstown Kilmeaden , Co. Waterford	NEW APPLICATION	PERMISSION	N/A	21/10/2024

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Application no.	Development description	Development address	Application status	Application type	Decision	Received Date
2460633	Construction of a two-storey residential dwelling, entrance & driveway, borehole, wastewater treatment plant & percolation area, landscaping and all ancillary site works	Gortaclade , Kilmeaden , Co Waterford	FURTHER INFORMATION	PERMISSION	N/A	30/10/2024
2460641	for the as-constructed altered ground embankment levels permitted under planning reg. no. 22/507 and PERMISSION is sought for the erection of new boundary screen wall abutting existing rear boundary, all at rear of sites 1-12	ClochÃin , Adamstown Kilmeaden , Co. Waterford	FURTHER INFORMATION	RETENTION	N/A	04/11/2024
2460680	for the indefinite Retention of alterations to our existing dwelling, incorporating; 1. Single storey extension to rear. (South) 2. Single story extension to side. (East) 3. Construction of a two-storey domestic store together with all associated site d	Amberhill , Kilmeaden , Co. Waterford	NEW APPLICATION	RETENTION	N/A	15/11/2024
2460715	for attic conversion to existing house and garage as constructed	Gortaclode , kilmeaden , Co. waterford	NEW APPLICATION	RETENTION	N/A	26/11/2024
2460732	to construct a single-storey extension to the side of existing dwelling, decommission existing septic tank, install a new waste water treatment system and percolation area and all ancillary site works	Raheens , Kilmeaden , Co. Waterford	NEW APPLICATION	PERMISSION	N/A	03/12/2024
2460769	to build a single storey, detached house, with attic accommodation of office/study, guest bedroom and domestic storage and an adjacent single storey garage, together with associated siteworks, including driveway and entrance from adjoining public road (	Ross , Kilmeaden , Co. Waterford	NEW APPLICATION	PERMISSION	N/A	17/12/2024

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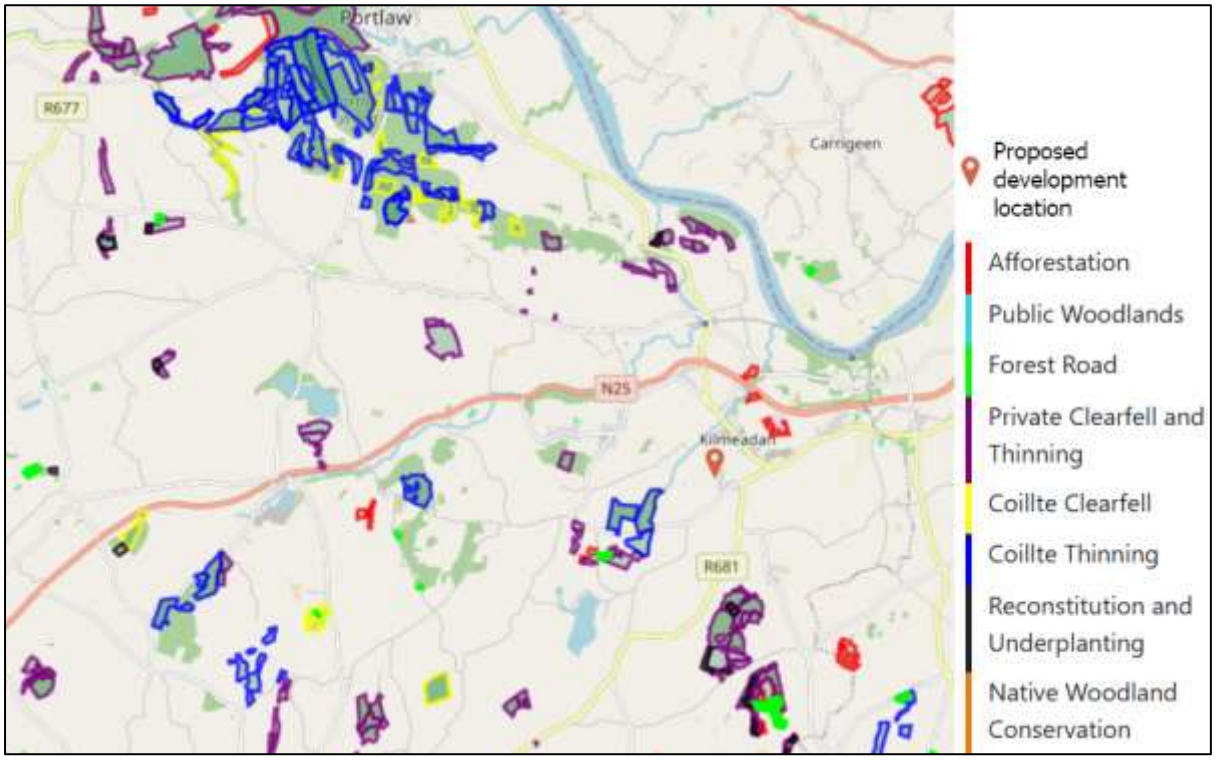
7.10.1.3 Forestry licence search

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A search was undertaken of forestry licences (pending and decided) within the vicinity of the proposed development to identify projects which could act in-combination to negatively impact Natura 2000 sites. Projects were identified within the Dawn[River]_SC_010 sub-catchment following consultation with the Forestry Licence Viewer5 and are indicated in Figure 7-43.

As regards any cumulative impacts, any application for a Forestry Regulation SI 191/2017 licence and/or forestry grant support would be subject to the Appropriate Assessment process. If there is a negative impact of the proposed development on the quality of surface and/or ground water, there is a potential for cumulative negative impact. In order to prevent cumulative impacts, it must be ensured that there are no negative impacts on surface and/or ground water quality.

Figure 7-43 Forestry licence viewer map indicating pending and decided forestry licences proximate to the proposed development.



7.10.1.4 EIA Portal search

A search of projects requiring assessment under the European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU was carried out on the Department of Housing, Local Government and Heritage's EIA Portal[6]. Two developments that have the potential to impact in combinations subject to assessment under the EIA Directive proximate to the proposed development were identified:

- Portal ID **2022023**: Restoration of a disused rock and gravel quarry comprising some 3.26 hectares to agricultural use using imported inert soil and stone classified as Article 27 by-products of the

[5] Available from: https://forestry-maps.apps.rhos.agriculture.gov.ie/ Accessed 17 January 2025.
[6] Available from: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1 Accessed 17 January 2025.

construction. An Appropriate Assessment screening report of the development found that the project would not have any cumulative impact on the Natura 2000 network

- Portal ID **2022162**: Biopharmaceutical Development and Manufacturing Campus, as an extension to the existing Horizon Development and Manufacturing Facility. A Natura Impact Statement was prepared for this development, which found that the "*…mitigation measures incorporated into the design of the proposed project allow a conclusion to be arrived at that there will be no significant adverse effects as a result of the proposed project either alone or in combination with other plans/projects…*"

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Figure 7-44 Projects subject to assessment under the EIA Directive proximate to the proposed development.



7.11 Conclusions

Having identified Key Ecological Receptors on site and assessed the potential for impacts associated with the proposed development on Key Ecological Receptors, it is the professional opinion of the author of this report that assuming full implementation of all mitigation measures outlined in the EIAR, there will be no significant adverse effects on ecology/biodiversity associated with the proposed development. Indeed, the implementation of an appropriate Habitat and Biodiversity Conservation and Management Plan will enhance the ecological and biodiversity resource occurring.

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Chapter 8 – Air Quality

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8. AIR QUALITY

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8.1 Introduction

This chapter of the EIAR was prepared to assess the likely significant effects on air quality as a result of the proposed development at Kilmeaden, Co. Waterford. The proposed development includes a village centre, a technology park – including a Power Generation Facility (PGF) or 'energy centre' and information communication technology (ICT) facilities, as well as a proposed renewable energy solar park.

The air quality assessment comprises the following:

- Assessment of the impact of construction dust emissions from the construction phase of the proposed development in terms of dust soiling and dust-related human health effects.
- Assessment of the increase in operational phase traffic emissions due to the proposed development and the likely impact on ambient air quality and human health.
- Air dispersion modelling of operational phase emissions from the proposed technology park and the likely impact on ambient air quality, human health and sensitive ecological sites.
- Assessment of the indirect impact on air quality due to the generation of renewable electricity from the proposed solar park and the likely offsetting of fossil fuel derived electricity generation.

8.2 Methodology

8.2.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of likely impacts on Air Quality is summarised below.

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Institute of Air Quality Management (IAQM), 2024);
- A Guide to The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020);
- TII Guidance Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022);
- TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107 (TII, 2024);
- Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (EPA, 2020).

8.2.2 Assessment Criteria

8.2.2.1 Human Health

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

8.2.2.1.1 Ambient Air Quality Standards

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Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)*. This Directive sets out new air quality standards for pollutants to be reached by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines.

Prior to 2030 the air quality standards set out in EU Directive 2008/50/*EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* are still applicable.

The Air Quality Standards Regulations 2022 (S.I. 739 of 2022) transposed EU Directive 2008/50/EC. With the adoption of Directive (EU) 2024/2881, Ireland must transpose this Directive into national law (i.e. update the Air Quality Standards Regulations) before 11 December 2026.

The ambient air quality standards applicable for nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$) are outlined in Table 8.1. The limit values set out in Directive (EU) 2024/2881 will need to be achieved by 2030, with the limit values set out in the Air Quality Standards Regulations 2022 (and future updated regulations) applicable until 2030.

Table 8.1 Ambient Air Quality Limit Values

Pollutant	Directive 2008/50/EC		Directive (EU) 2024/2881	
	Limit Type	Limit Value (applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m^3
	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
NO_X	Annual limit for protection of vegetation	30 µg/m^3	Annual limit for protection of vegetation	30 µg/m^3
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as $PM_{2.5}$)	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m^3
	Annual limit for protection of human health	25 µg/m^3	Annual limit for protection of human health	10 µg/m^3

8.2.2.1.2 WHO Air Quality Guidelines & Clean Air Strategy

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In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 8.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that *"Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II."*

These assessment thresholds relate to monitoring of ambient air quality by Member States, where *"exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years."*

Table 8.2 WHO Air Quality Guidelines

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25 µg/m^3
	Annual limit for protection of human health	20 µg/m^3	-	10 µg/m^3
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m^3	50 µg/m^3	45 µg/m^3
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	15 µg/m^3
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5 µg/m^3	25 µg/m^3	15 µg/m^3
	Annual limit for protection of human health	15 µg/m^3	10 µg/m^3	5 µg/m^3

The applicable air quality limit values for the purposes of this assessment are those set out in Table 8.1. The limit values stipulated under Directive 2008/50/EC and the Air Quality Standards Regulations 2022 are applicable for the construction phase and opening year 2029 for the proposed development. The limit values stipulated by Directive (EU) 2024/2881 are applicable for the design year 2044 for the proposed development.

8.2.2.1.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust, which are less than 10 microns, and the EU ambient air quality standards outlined in Table 8.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

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However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust effects from construction of the proposed development.

8.2.2.1.4 Air Quality and Traffic Impact Significance Criteria

The Transport Infrastructure Ireland (TII) guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) and reproduced in Table 8.3 below. These criteria have been adopted for the proposed development to predict the impact of NO_2, PM_{10} and $PM_{2.5}$ emissions as a result of the traffic associated with the proposed development.

Table 8.3 Air Quality & Traffic Significance Criteria

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Limit Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source TII (TII, 2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

As per Table 8.3 a neutral effect is one where a change in concentration at a receptor is:

- 5% or less where the opening year, without the proposed development, annual mean concentration is 75% or less of the standard; or
- 1% or less where the opening year, without the proposed development, annual mean concentration is 94% or less of the standard.

Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (2022) states that "*the evaluation of significance of effects for the operational phase should be undertaken for the opening year only as the design year is likely to show lower total pollutant concentrations and changes in concentration*" (TII, 2022).

Non-significant effects (i.e. of local importance only) are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial' however, the TII guidance (2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

The impact descriptors in Table 8.3 are used to describe the impact at each modelled receptor location, and the significance of the impacts is then determined, aligning with the terminology in the EPA guidelines (EPA 2022). Whilst it may be determined that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, an overall judgement is made of whether the likely effect of the proposed development is 'significant' or 'not significant' in terms of air quality. Factors to consider when determining the overall significance of a proposed development are provided in Table 4.10 of the TII guidance (TII, 2022).

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8.2.2.2 Ecology

8.2.2.2.1 Critical Levels

The Air Quality Standards Regulations 2022 outline an annual critical level of 30 µg/m^3 for NO_X (Table 8.1) for the protection of vegetation and natural ecosystems in general. The CAFE Directive (2008/50/EC) defines 'Critical Levels' as "*a level fixed on the basis of scientific knowledge, above which direct adverse effects may occur on some receptors, such as trees, other plants or natural ecosystems but not on humans*".

8.2.2.2.2 Critical Loads

A 'Critical Load' is defined by the United Nations Economic Commission for Europe (UNECE) as *"a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge"* (UNECE, 2003).

Critical loads are presented as a range, within which there is the potential for effects on sensitive ecological receptors. Critical load ranges for N deposition and acid deposition were derived from the Air Pollution Information System (APIS) website (APIS, 2025) and are reproduced as shown in Table 8.4 and Table 8.5. Also shown in these tables are the site feature code and name (i.e. the qualifying feature the site is designated for), the corresponding critical load class and EUNIS codes (European Nature Information System (EUNIS) by the European Environment Agency).

Critical loads are only available for internationally designated habitats (Special Protection Area (SPA) and Special Area of Conservation (SAC)), and for nationally designated Natural Heritage Areas (NHA).

Critical loads for proposed Natural Heritage Areas (pNHAs) are not defined on the APIS website. In the absence of defined critical loads, and in order to carry out an assessment for pNHAs, the site synopsis for each pNHA (NPWS, 2025) relevant to this assessment was reviewed for its range of habitats. Where possible, pNHA habitats identified from the site synopsis were assigned an equivalent nitrogen deposition or critical load class. These can be derived by searching APIS for the habitat type, rather than a specific site, or by reviewing SACs and SPAs with similar features. Where no equivalent critical load class could be assigned or a site synopsis was not available this has been denoted by "n/a". The absence of this information has not affected our assessment or ability to perform a robust assessment of the likely significant effects of the proposed development on air quality.

As pNHAs are not fully designated Natural Heritage Areas and therefore have not undergone the same process of qualifying feature identification (which can then be processed by APIS), the critical load classes assigned to pNHA habitats are an interpretation as part of this assessment, and may vary from those identified in future should the pNHA become fully designated.

In order to determine the appropriate nitrogen deposition critical load, and in addition to APIS, the EPA publication *Research 390: Nitrogen-Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats* (EPA, 2021) was consulted. In Table 3.2 of the publication empirical critical loads of nutrient nitrogen are outlined with a worst-case range of 5-10 kg/ha/yr for most habitat types. In addition, for most habitat types, the EPA publication recommends the midpoint is used to define the critical load (e.g.

7.5 kg/ha/yr). Thus, the mid-range critical load for the worst-case habitat type within the relevant sites have been used to compare with modelled process contributions.

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Acid deposition critical loads are further categorised by nitrogen (N) or sulphur (S) components. Modelled acid deposition process contributions are therefore calculated in terms of both nitrogen (N) and sulphur (S) where relevant (see Section 0).

Deposition of sulphur (as sulphate (SO_4^{2-})) and nitrogen (as nitrate (NO_3^-), ammonium (NH_4^+) and nitric acid (HNO_3^-)), can cause acidification and both sulphur and nitrogen compounds must be taken into account when assessing acidification of soils. For the purposes of determining links between critical loads and atmospheric emissions of sulphur and nitrogen, critical loads are further derived to produce a maximum critical load for sulphur (CLmaxS), a minimum critical load for nitrogen (CLminN) and a maximum critical load for nitrogen (CLmaxN). These components define the critical load function and when compared with deposition data for sulphur and nitrogen, they can be used to assess critical load exceedances.

The modelled acid deposition process contributions (as N) have been compared to the minimum critical load (N) (MinCLminN). Where a process contribution is greater than 1% of this minimum critical load, the predicted environmental concentration (PEC) should then be calculated by adding the acid deposition background concentration to the process contribution. The PEC should then be compared to the lower end of the maximum critical load (N) range i.e. MaxCLminN. This is in line with the *Screening Acidity Critical Loads* approach taken by APIS (available as a tab in the APIS app) for designated sites. Notably, APIS does not consider the critical load function to be exceeded unless the PEC is larger than the maximum critical load, not the minimum (which is typically considered worst case).

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Table 8.4 Critical Loads for Nitrogen Deposition

Ecological Receptor		Feature Code	Feature Name	Critical loads for most sensitive feature*			Nitrogen Critical Load Class	EUNIS code	Is species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
Site Name	Site Code			Min. Critical Load for N (kg N/ha/yr)	Max. Critical Load for N (kg N/ha/yr)	Assessment Criteria				
Natura 2000										
Lower River Suir SAC	002137	H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	No	-
Tramore Dunes and Backstrand SAC	000671	H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	No	-
Mid-Waterford Coast SPA	004193	A346	Pyrrhocorax pyrrhocorax	5	10	7.5	Northern wet heath: Erica tetralix dominated wet heath	F4.11	-	Potential negative impact on species due to impacts on the species' broad habitat.
Tramore Back Strand SPA	004027	A140	Pluvialis apricaria [North-western Europe]	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	-	1. Potential negative impact on species due to impacts on the species' broad habitat. 2. Potential positive impact on species due to impacts on the species' food supply.
National Sites										
Ballin Lough (Waterford) pNHA	001691	n/a	No equivalent critical load class on APIS	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ballyvoyle Head To Tramore pNHA	001693	n/a	Pyrrhocorax pyrrhocorax	5	15	10	Low and medium altitude hay meadows	E2.2	n/a	n/a
Belle Lake pNHA	000659	n/a	Broadleaved deciduous woodland	10	20	15	Broadleaved deciduous woodland	G1.8	n/a	n/a

Ecological Receptor		Feature Code	Feature Name	Critical loads for most sensitive feature*			Nitrogen Critical Load Class	EUNIS code	Is species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
Site Name	Site Code			Min. Critical Load for N (kg N/ha/yr)	Max. Critical Load for N (kg N/ha/yr)	Assessment Criteria				
Carrickavrantry Reservoir pNHA	000660	n/a	Transition mires and quaking bogs	10	15	12.5	Valley mires, poor fens and transition mires	D2	n/a	n/a
Castlecraddock Bog pNHA	001695	n/a	Transition mires and quaking bogs	10	15	12.5	Valley mires, poor fens and transition mires	D2	n/a	n/a
Fennor Bog pNHA	001697	n/a	Transition mires and quaking bogs	10	15	12.5	Valley mires, poor fens and transition mires	D2	n/a	n/a
Fiddown Island pNHA	000402	n/a	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	n/a	n/a
Grannyferry pNHA	000833	n/a	Pioneer, low-mid, mid-upper saltmarshes	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	n/a	n/a
Islandtarnsey Fen pNHA	000666	n/a	Transition mires and quaking bogs	10	15	12.5	Valley mires, poor fens and transition mires	D2	n/a	n/a
Kilbarry Bog pNHA	001700	n/a	Transition mires and quaking bogs	10	15	12.5	Valley mires, poor fens and transition mires	D2	n/a	n/a
King's Channel pNHA	001702	n/a	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	n/a	n/a
Lissaviron Bog pNHA	001705	n/a	Transition mires and quaking bogs	10	15	12.5	Valley mires, poor fens and transition mires	D2	n/a	n/a

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Ecological Receptor		Feature Code	Feature Name	Critical loads for most sensitive feature*			Nitrogen Critical Load Class	EUNIS code	Is species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
Site Name	Site Code			Min. Critical Load for N (kg N/ha/yr)	Max. Critical Load for N (kg N/ha/yr)	Assessment Criteria				
Lough Cullin pNHA	000406	n/a	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	5	15	10	Moist and wet oligotrophic grasslands: Molinia caerulea meadows	E3.51	n/a	n/a
Lower River Suir (Coolfinn, Portlaw) pNHA	000399	n/a	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	n/a	n/a
Portlaw Woods pNHA	000669	n/a	Taxus baccata woods of the British Isles	5	15	10	Coniferous woodland	G3	n/a	n/a
Tibberaghny Marshes pNHA	000411	n/a	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	n/a	n/a
Tramore Dunes And Backstrand pNHA	000671	n/a	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5	10	7.5	Pioneer, low-mid, mid-upper saltmarshes	A2.54; A2.55; A2.53	n/a	n/a

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Table 8.5 Critical Loads for Acid Deposition

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Ecological Receptor		Feature Code	Feature Name	Acidity Critical Load Class	Max. Critical Load Range (N) (keq/ha/yr)		Min. Critical Load Range (N) (keq/ha/yr)		Is species sensitive due to acidity impacts on broad habitat?	Reason
Site Name	Site Code				MaxCL minN	MaxCL maxN	MinCL minN	MinCL maxN		
Natura 2000										
Lower River Suir SAC	002137	S1103	Alosa fallax	Freshwater	0.714	6.22	0.143	0.433	Yes	Potential negative impact on species due to impacts on the species' broad habitat.
Tramore Dunes and Backstrand SAC	000671	H2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Acid grassland	0.714	5.526	0.143	4.452	-	-
Mid-Waterford Coast SPA	004193	A017	Phalacrocorax carbo (North-western Europe)	Freshwater	0.286	5.333	0.143	0.878	Yes	Potential negative impact on species due to impacts on the species' broad habitat.
Tramore Back Strand SPA	004027	A160	Numenius arquata (Europe - breeding)	Calcareous grassland (using base cation)	0.714	5.526	0.143	4.452	No	No expected negative impact on the species due to impacts on the species' broad habitat.
National Sites										
Ballin Lough (Waterford) pNHA	001691	n/a	Transition mires and quaking bogs	Bogs	0.143	5.052	0.143	4.861	n/a	n/a
Ballyvoyle Head To Tramore pNHA	001693	n/a	Phalacrocorax carbo (North-western Europe)	Freshwater	0.286	5.333	0.143	0.878	n/a	n/a
Belle Lake pNHA	000659	n/a	Old sessile oak woods with Ilex and Blechnum in the British Isles	Unmanaged Broadleafed/Coniferous Woodland	0.714	5.634	0.143	0.507	n/a	n/a
Carrickavrantry Reservoir pNHA	000660	n/a	Transition mires and quaking bogs	Bogs	0.286	5.052	0.143	4.861	n/a	n/a
Castlecraddock Bog pNHA	001695	n/a	Transition mires and quaking bogs	Bogs	0.143	5.052	0.143	4.861	n/a	n/a
Fennor Bog pNHA	001697	n/a	Transition mires and quaking bogs	Bogs	0.143	5.052	0.143	4.861	n/a	n/a
Fiddown Island pNHA	000402	n/a	Alosa fallax	Freshwater	0.714	6.22	0.143	0.433	n/a	n/a
Grannyferry pNHA	000833	n/a	Transition mires and quaking bogs	Bogs	0.286	5.052	0.143	4.861	n/a	n/a
Islandtarnsey Fen pNHA	000666	n/a	Transition mires and quaking bogs	Bogs	0.286	5.052	0.143	4.861	n/a	n/a
Kilbarry Bog pNHA	001700	n/a	Transition mires and quaking bogs	Bogs	0.143	5.052	0.143	4.861	n/a	n/a
King's Channel pNHA	001702	n/a	Alosa fallax	Freshwater	0.714	6.22	0.143	0.433	n/a	n/a
Lissaviron Bog pNHA	001705	n/a	Transition mires and quaking bogs	Bogs	0.143	5.052	0.143	4.861	n/a	n/a

Ecological Receptor		Feature Code	Feature Name	Acidity Critical Load Class	Max. Critical Load Range (N) (keq/ha/yr)		Min. Critical Load Range (N) (keq/ha/yr)		Is species sensitive due to acidity impacts on broad habitat?	Reason
Site Name	Site Code				MaxCL minN	MaxCL maxN	MinCL minN	MinCL maxN		
Lough Cullin pNHA	000406	n/a	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	Acid grassland	0.286	1.829	0.143	0.524	n/a	n/a
Lower River Suir (Coolfinn, Portlaw) pNHA	000399	n/a	Alosa fallax	Freshwater	0.714	6.22	0.143	0.433	n/a	n/a
Portlaw Woods pNHA	000669	n/a	Alosa fallax	Freshwater	0.714	6.22	0.143	0.433	n/a	n/a
Tibberaghny Marshes pNHA	000411	n/a	Alosa fallax	Freshwater	0.714	6.22	0.143	0.433	n/a	n/a
Tramore Dunes And Backstrand pNHA	000671	n/a	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Acid grassland	0.714	5.526	0.143	4.452	n/a	n/a

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8.2.2.2.3 Appropriate Assessment (AA) & IN2

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In October 2024, the EPA published the draft guidance *Licence Application Instruction Note 2 (IN2) (DRAFT): Assessing the Impact of Ammonia Emissions to Air and Nitrogen Deposition from EPA licensable activities on European Sites* (hereafter referred to as IN2).

IN2 and the flowchart shown in Figure 8.1 (reproduced from Appendix 1 of IN2) is designed to assist in determining the course of action to be taken when evaluating the impacts on European sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs)) and of ammonia emissions to air and nitrogen deposition from main air emission points at EPA licensable industrial sites (Industrial Emissions, Integrated Pollution Control and Waste), excluding intensive agriculture installations, for the purposes of an Appropriate Assessment (AA). This approach may also be applied to NO_X and SO_2 specifically in the context of AA.

Once permitted, the proposed development will be a licensable facility, and therefore the methodology from IN2 and the flowchart steps are applicable to the proposed development activities and are considered appropriate for determining ecological impacts from a variety of air pollutant emission sources. The IN2 criteria outlined below have therefore been applied in this assessment:

1. The installation is not within 250 m of a European site. Proceed to Q2.

2. (i) Is the process contribution (PC) ≤1% of the relevant critical level and critical load at all European sites within the zone of influence, and (ii) can significant in-combination effects be ruled out?

    - The PCs for the Lower River Suir SAC are greater than 1% of the relevant critical levels and critical load and therefore, the impact of air emissions at this site have been assessed in further detail. Additionally, the PCs for a number of nationally designated pNHAs are above 1% of the relevant critical loads for acid deposition. The results of this screening exercise are presented in Section 0. Proceed to Q3.
    - Planning applications and the EPA register of Industrial Emissions (IE) licences was reviewed for developments and facilities with the potential for cumulative impact with the proposed development as per the EPA AG4 guidance (EPA, 2020). There are no planned or existing development or IE licenced facilities within 1 km of the proposed development which operate any significant sources of NO_2, therefore no cumulative impact assessment was required.

3. Does modelling indicate that the Predicted Environmental Concentration (PEC) will exceed a critical level and/or critical load for any qualifying interests for European Sites within the zone of influence?

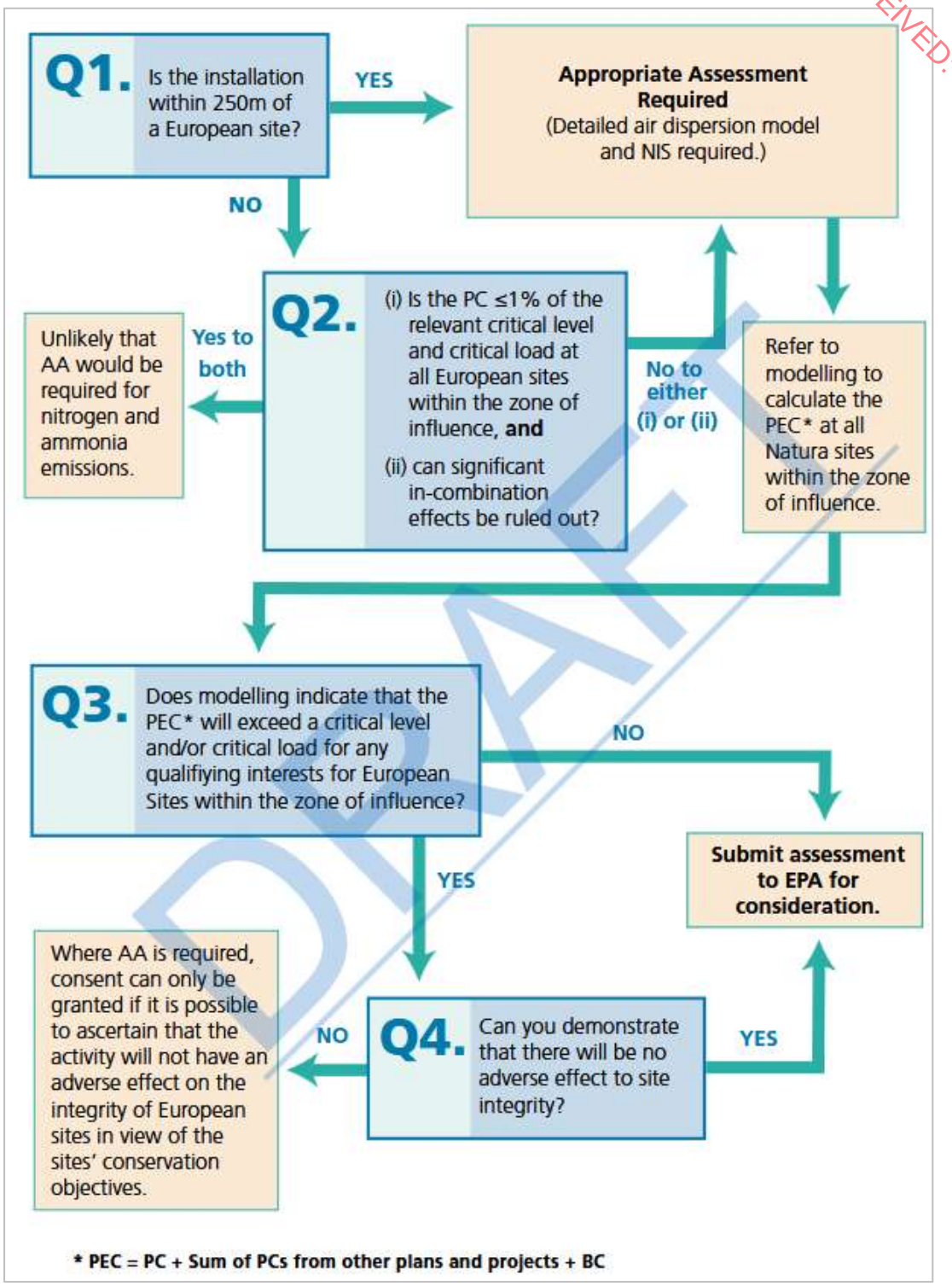
    - Nitrogen deposition and acid deposition PECs have been calculated for all European sites where the PC is greater than 1% of the relevant critical load. These are presented in Section 0. Whether the PECs exceed critical loads and if there are adverse effects to site integrity was determined in consultation with the project ecologist.

Process contributions of NO_X and acid deposition at European sites have also been compared to the relevant critical levels, as suggested by IN2, to identify which sites require further assessment i.e. where the PC is greater than 1%.

The same approach has been taken to assess the effect of emissions impacts on nationally designated sites such as Natural Heritage Areas (NHAs) and proposed NHAs.

Figure 8.1 IN2 flowchart for assessing the impacts of nitrogen deposition and ammonia emissions to air on European Sites

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8.2.2.3 National Air Emissions Targets

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Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (hereafter referred to as the National Emissions Reduction Directive) was published in December 2016. The National Emissions Reduction Directive applied the limits set out in *Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants* (hereafter referred to as the National Emission Ceiling Directive) until 2020 and established new national emission reduction commitments which are applicable from 2020 and 2030 for SO_2, NO_X, non-methane volatile organic compounds (NMVOC), ammonia (NH_3), $PM_{2.5}$ and methane (CH_4). In relation to Ireland, the 2020 to 2029 emission targets are 25kt (kilotonnes) for SO_2 (65% reduction on 2005 levels), 65kt for NO_X (49% reduction on 2005 levels), 43kt for NMVOCs (25% reduction on 2005 levels), 108kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels) as shown in Table 8.6. In relation to 2030, Ireland's emission targets are 85% below 2005 levels for SO_2, 69% reduction for NO_X, 32% reduction for VOCs, 5% reduction for NH_3 and 41% reduction for $PM_{2.5}$, also shown in Table 8.6.

The emissions ceilings in relation to NO_X have been used in the current assessment of operational phase renewable electricity production from the proposed solar park development (see Section 8.5.3.3). Emissions from the operation of the power generation facility element of the proposed development are discussed in Section 8.5.3.2.

Table 8.6 National Air Emission Targets

Pollutant	2020 – 2029 Reduction Commitments		2030 Reduction Commitments	
	kt	% Reduction Compared to 2005 Levels	kt	% Reduction Compared to 2005 Levels
SO_2	25.6	-65%	10.96	-85%
NO_X	66.8	-49%	40.6	-69%
NMVOC	56.3	-25%	51.1	-32%
NH_3	112.1	-1%	107.5	-5%
$PM_{2.5}$	15.6	-18%	11.2	-41%

8.2.3 Construction Phase Methodology

8.2.3.1 Construction Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the dust impacts and any likely significant effects of same in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022).

The major dust generating activities are divided into four types within the IAQM guidance (2024) to reflect their different likely impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 8.7, these are based on the IAQM guidance (2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

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Table 8.7 IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
► total building volume <12,000 m^3 ► construction material with low potential for dust release (e.g. metal cladding or timber) ► demolition activities <6 m above ground ► demolition during wetter months	► total building volume 12,000 - 75,000 m^3 ► potentially dusty construction material ► demolition activities 6 – 12 m above ground level	► total building volume >75,000 m^3 ► potentially dusty construction material (e.g. concrete) ► on-site crushing and screening ► demolition activities >12 m above ground level
Earthworks		
► total site area <18,000 m^2 ► soil type with large grain size (e.g. sand) ► <5 heavy earth moving vehicles active at any one time ► formation of bunds <3 m in height ► earthworks during wetter months	► total site area 18,000 m^2 - 110,000 m^2 ► moderately dusty soil type (e.g. silt) ► 5 – 10 heavy earth moving vehicles active at any one time ► formation of bunds 3 – 6 m in height	► total site area >110,000 m^2 ► potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) ► >10 heavy earth moving vehicles active at any one time ► formation of bunds >6 m in height
Construction		
► total building volume <12,000 m^3 ► construction material with low potential for dust release (e.g. metal cladding or timber)	► total building volume 12,000 - 75,000 m^3 ► potentially dusty construction material (e.g. concrete) ► on-site concrete batching	► total building volume >75,000 m^3 ► on-site concrete batching ► sandblasting
Trackout (truck movements)		
► <20 HDV (>3.5 t) outward movements in any one day ► surface material with low potential for dust release ► unpaved road length <50 m	► 20 – 50 HDV (>3.5 t) outward movements in any one day ► moderately dusty surface material (e.g. high clay content) ► unpaved road length 50 – 100 m	► >50 HDV (>3.5 t) outward movements in any one day ► potentially dusty surface material (e.g. high clay content) ► unpaved road length >100 m

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area

to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 8.8.

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Table 8.8 IAQM Criteria to Determine Risk of Dust Impacts

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

8.2.3.2 Construction Traffic Assessment

Construction phase traffic has the potential to affect air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. As a result, a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts or effects to air quality.

8.2.4 Operational Phase Methodology

8.2.4.1 Operational Traffic Assessment

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 8.2.3.2 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. AtkinsRealis have prepared a Traffic and Transport

Impact Assessment for the proposed development enclosed separately and have prepared Chapter 13 (Material Assets Traffic & Transport). The traffic assessment has included traffic associated with other specific cumulative developments, as required. This ensures the full cumulative impact is assessed. It has been determined that the proposed development will result in the operational phase traffic increasing by more than 1,000 AADT on a number of road links. Therefore, in accordance with the TII scoping criteria a detailed air dispersion modelling assessment of operational phase traffic emissions was conducted.

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The impact of traffic emissions on air quality is assessed for both human and ecological receptors within 200 m of impacted roads as per the TII PE-ENV-01106 guidance (TII, 2022). There are no sensitive ecological sites within 200 m of any of the identified impacted roads and therefore an assessment of air quality impacts to ecology from traffic emissions is not required. The following sections describe the methodology for the assessment.

The impact to air quality as a result of changes in traffic is assessed at sensitive human receptors in the vicinity of affected roads. These are discussed in further detail within Section 8.3.3.2 and shown graphically in Figure 8.5.

The TII guidance (2022) states that modelling should be conducted for NO_2, PM_{10} and $PM_{2.5}$ for the Base, Opening and Design Years for both the Do Minimum (Do Nothing) and Do Something scenarios. Modelling of operational NO_2, PM_{10} and $PM_{2.5}$ concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2024).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The *Default* fleet mix option was selected along with the *Intermediate Case* fleet data base selection, as per TII Guidance (TII, 2022b). The *Intermediate Case* assumes a linear interpolation between the *Business as Usual* case – where current trends in vehicle ownership continue and the *Climate Action Plan (CAP)* case – where adoption of low emission light duty vehicles occurs.

Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM_{10} emissions associated with brake and tyre wear (TII, 2024). The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

Traffic Data used in Operational Phase Air Quality Assessment

Traffic flow information is detailed in Table 8.9 as obtained from AtkinsRéalis for the purposes of this assessment. Data for the Do Nothing and Do Something scenarios for the Opening Year 2029 and Design Year 2044 were provided. The traffic data included specific cumulative developments in the area as required.

The modelling assessment has been undertaken for road links that were within 200 m of receptors as per the TII guidance (TII, 2022). Background concentrations have been included as per Section 8.3.2 of this chapter based on available EPA background monitoring data (EPA, 2024).

Table 8.9 Traffic Data used in Operational Phase Air Quality Assessment

Road Name	Speed (kph)	Opening Year		Design Year	
		Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
Between Carrick Rd Roundabout (Junction 1) and Junction 2	55	11482 (910)	13220 (910)	12994 (1328)	14732 (1328)
Between Junction 2 and Lacka Road (Junction 3)	50	12692 (983)	14799 (983)	14342 (1413)	16449 (1413)
Between Lacka Road (Junction 3) and Junction 4	50	12823 (989)	15088 (989)	14501 (1395)	16767 (1395)
Between Junction 4 and the Proposed Access	50	12724 (934)	15035 (934)	14381 (1310)	16692 (1310)
Between R681 (Junction 5) and R682 (Junction 6)	50	14069 (946)	16220 (946)	15925 (1335)	18077 (1335)
East of Junction 6	60	14538 (855)	16218 (855)	16439 (1219)	18119 (1219)
Between Proposed Access and Junction 5	50	13059 (0)	15492 (0)	14779 (0)	17211 (0)
Between Junction 4 and R681 (Junction 5)	50	0 (0)	3439 (0)	0 (0)	3439 (0)

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8.2.4.2 Air Dispersion Modelling

Emissions from the proposed development have been modelled to establish the operational phase, or Proposed Operations scenario, using the AERMOD dispersion model (Version 24142) which has been developed by the U.S. Environmental Protection Agency (USEPA) (USEPA, 2024) and following guidance issued by the EPA (EPA, 2020).

The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources and has replaced ISCST3 (USEPA, 1995) as the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain (USEPA, 1998; USEPA, 2000; USEPA, 2024). The model has more advanced algorithms and gives better agreement with monitoring data in extensive validation studies (USEPA, 1998; USEPA, 1999; Paine 1997a; Paine 1997b; Schulman, 2000). An overview of the AERMOD dispersion model is outlined in Appendix 8.1.

The air dispersion modelling input data consisted of information on the physical environment (including building dimensions and terrain features), design details from all emission points on-site and five years of appropriate hourly meteorological data. Using this input data the model predicted ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration was then added to the background concentration to give the worst-case predicted environmental concentration (PEC). The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

Modelling for NO_2 was undertaken in detail. In relation to CO, PM_{10} and $PM_{2.5}$ no detailed modelling was undertaken. Emissions of these pollutants are significantly lower than the NO_X emissions from the emission points relative to their ambient air quality standards and thus ensuring compliance with the NO_2 ambient limit value will ensure compliance for all other pollutants. For example, the emission of CO from the back-up generators is at least ten times lower than NO_X whilst the CO ambient air quality standard is 10,000 µg/m^3 compared to the 1-hour NO_2 standard of 200 µg/m^3. Similarly, levels of PM_{10}/$PM_{2.5}$ emitted from the turbines and generators will be significantly lower than NO_X emissions whilst the ambient air quality standards are comparable.

Throughout this study a conservative approach was taken. This will most likely lead to an over-estimation of the levels that will arise in practice. The conservative assumptions are outlined below:

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- Maximum predicted concentrations were reported in this study, even if no residential receptors were near the location of this maximum;
- Conservative background concentrations were used in the assessment;
- The effects of building downwash, due to on-site buildings, has been included in the model;
- The main emission points (gas turbines) were assumed to operate continuously for 24 hours a day, 365 days a year in all scenarios- see 8.2.4.2.7.

The United States Environmental Protection Agency (USEPA) approved AERMOD dispersion model has been used to predict the ground level concentrations (GLC) of compounds emitted from the principal emission sources on-site.

The modelling incorporated the following features:

- Modelled receptors included the proposed development boundary, gridded receptors and discrete sensitive receptors. These are described in more detail in Section 8.3.3.2.2.

- All on-site buildings and significant process structures were mapped into the computer to create a three-dimensional visualisation of the site and its emission points. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack tip downwash). Both building and stack tip downwash were incorporated into the modelling.

- Detailed terrain has been mapped into the model using SRTM data with 30m resolution. The site is located in an area of relatively simple terrain. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP (USEPA, 2017).

- Hourly-sequenced meteorological information has been used in the model. Meteorological data over a five year period (Johnstown Castle 2020 - 2024) was used in the model (see Figure 8.3 and Appendix 8.2).

- The source and emissions data, including stack dimensions, gas volumes and emission temperatures have been incorporated into the model.

8.2.4.2.1 Methodology for Modelling of Emergency Operations

Regarding emergency operations, USEPA Guidance suggests an average hourly emission rate should be used rather than the maximum hourly rate (USEPA, 2011). As a result, the maximum hourly emission rates from the back-up generators were reduced by *72 no. hours / 8760* and the emissions were modelled over a period of one full year.

A second methodology has been published by the UK Environment Agency. The relevant guidance documents are entitled *Diesel Generator Short-Term NO_2 Impact Assessment* (UKEA, 2016) and *Emissions from specified generators - Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators* (UKEA, 2019). The methodology is based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value (18 exceedances are allowable per year before the air standard is deemed to have been exceeded, as per S.I. 739 of 2022 and 2008/50/EC). The assessment assumes a hypergeometric distribution to assess the likelihood of exceedance hours coinciding with the emergency operational hours of the generators. The cumulative hypergeometric distribution of 19 and more hours per year is computed and the probability of an exceedance determined. The guidance suggests that the 98th percentile confidence level should be used to indicate if an exceedance is likely. The guidance suggests that the assessment should be conducted at the nearest residential receptor or at locations where people

are likely to be exposed and that there should be no running time restrictions on these generators when providing power on site during an emergency.

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Both the methodology advised in the USEPA guidance as well as the approach described in the UK EA guidance have been applied for the scenarios modelled in this study to ensure a robust assessment of predicted air quality impacts from the facility. This also follows the guidance outlined in Appendix K of the EPA AG4 guidance (EPA, 2020).

8.2.4.2.2 Terrain

The AERMOD air dispersion model has a terrain pre-processor AERMAP (USEPA, 2017) which was used to map the physical environment in detail over the receptor grid. The digital terrain input data used in the AERMAP pre-processor was obtained from SRTM. This data was run to obtain for each receptor point the terrain height and the terrain height scale. The terrain height scale is used in AERMOD to calculate the critical dividing streamline height, H_{crit}, for each receptor. The terrain height scale is derived from the Digital Elevation Model (DEM) files in AERMAP by computing the relief height of the DEM point relative to the height of the receptor and determining the slope. If the slope is less than 10%, the program goes to the next DEM point. If the slope is 10% or greater, the controlling hill height is updated if it is higher than the stored hill height.

In areas of complex terrain, AERMOD models the impact of terrain using the concept of the dividing streamline (H_c). As outlined in the AERMOD model formulation (USEPA, 2024) a plume embedded in the flow below H_c tends to remain horizontal; it might go around the hill or impact on it. A plume above H_c will ride over the hill. Associated with this is a tendency for the plume to be depressed toward the terrain surface, for the flow to speed up, and for vertical turbulent intensities to increase.

AERMOD model formulation states that the model "captures the effect of flow above and below the dividing streamline by weighting the plume concentration associated with two possible extreme states of the boundary layer (horizontal plume and terrain-following). The relative weighting of the two states depends on: 1) the degree of atmospheric stability; 2) the wind speed; and 3) the plume height relative to terrain. In stable conditions, the horizontal plume "dominates" and is given greater weight while in neutral and unstable conditions, the plume traveling over the terrain is more heavily weighted" (USEPA, 2024).

8.2.4.2.3 Geophysical Considerations

AERMOD simulates the dispersion process using planetary boundary layer (PBL) scaling theory (USEPA, 2024). PBL depth and the dispersion of pollutants within this layer are influenced by specific surface characteristics such as surface roughness, albedo and the availability of surface moisture. Surface roughness is a measure of the aerodynamic roughness of the surface and is related to the height of the roughness element. Albedo is a measure of the reflectivity of the surface whilst the Bowen ratio is a measure of the availability of surface moisture.

AERMOD incorporates a meteorological pre-processor AERMET (USEPA, 2018) to enable the calculation of the appropriate parameters. The AERMET meteorological pre-processor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10 km from the meteorological station for Bowen Ratio and albedo and to a distance of 1 km for surface roughness in line with USEPA recommendations (USEPA, 2008; USEPA, 2018) as outlined in Appendix 8.2.

In relation to AERMOD, detailed guidance for calculating the relevant surface parameters has been published (USEPA, 2018). The most pertinent features are:

- The surface characteristics should be those of the meteorological site (Johnstown Castle) rather than the installation;
- Surface roughness should use a default 1 km radius upwind of the meteorological tower and should be based on an inverse-distance weighted geometric mean. If land use varies around the site, the land use should be sub-divided by sectors with a minimum sector size of 30º;
- Bowen ratio and albedo should be based on a 10 km grid. The Bowen ratio should be based on an un-weighted geometric mean. The albedo should be based on a simple un-weighted arithmetic mean.

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AERMOD has an associated pre-processor, AERSURFACE (USEPA, 2008) which has representative values for these parameters depending on land use type. The AERSURFACE pre-processor currently only accepts NLCD92 land use data which covers the USA. Thus, manual input of surface parameters is necessary when modelling in Ireland. Ordnance survey discovery maps (1:50,000) and digital maps such as those provided by the EPA, National Parks and Wildlife Service (NPWS) and Google Earth® are useful in determining the relevant land use in the region of the meteorological station. The Alaska Department of Environmental Conservation has issued a guidance note for the manual calculation of geometric mean for surface roughness and Bowen ratio for use in AERMET (ADEC, 2008). This approach has been applied to the current site with full details provided in Appendix 8.2.

8.2.4.2.4 Building Downwash

When modelling emissions from an industrial installation, stacks which are relatively short can be subjected to additional turbulence due to the presence of nearby buildings. Buildings are considered nearby if they are within five times the lesser of the building height or maximum projected building width (but not greater than 800 m).

The USEPA has defined the "Good Engineering Practice" (GEP) stack height as the building height plus 1.5 times the lesser of the building height or maximum projected building width. It is generally considered unlikely that building downwash will occur when stacks are at or greater than GEP (USEPA, 1985).

When stacks are less than this height, building downwash will tend to occur. As the wind approaches a building it is forced upwards and around the building leading to the formation of turbulent eddies. In the lee of the building these eddies will lead to downward mixing (reduced plume centreline and reduced plume rise) and the creation of a cavity zone (near wake) where re-circulation of the air can occur. Plumes released from short stacks may be entrained in this airflow leading to higher ground level concentrations than in the absence of the building.

The Plume Rise Model Enhancements (PRIME) (Paine, 1997a; Paine, 1997b) plume rise and building downwash algorithms, which calculates the impact of buildings on plume rise and dispersion, have been incorporated into AERMOD. The building input processor BPIP-PRIME produces the parameters which are required in order to run PRIME. The model takes into account the position of each stack relative to each relevant building and the projected shape of each building for 36 wind directions (at 10º intervals). The model determines the change in plume centreline location with downwind distance based on the slope of the mean streamlines and coupled to a numerical plume rise model (Paine, 1997a).

Given that the proposed stacks are less than 2.5 times the lesser of the building height or maximum projected building width, building downwash will need to be taken into account and the PRIME algorithm run prior to modelling with AERMOD. Shown in Figure 8.2 is an example of the buildings (in blue) which influence the building downwash for stack OCGT16. The dominant building for each relevant stack will vary as a function of wind direction and relative building heights.

Figure 8.2 Example of Building Downwash at the Proposed Development



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8.2.4.2.5 NO_X to NO_2 Conversion

The Plume Volume Molar Ratio Method (PVMRM) was used to model NO_2 concentrations. The PVMRM is a regulatory option in AERMOD which assumes that the amount of NO converted to NO_2 is proportional to the ambient ozone concentration (Hanrahan, 1999a; Hanrahan 1999b). The PVMRM uses both plume size and O_3 concentration to derive the amount of O_3 available for the reaction between NO and O_3. NO_X moles are determined by emission rate and travel time through the plume segment. The concentration is usually limited by the amount of ambient O_3 that is entrained in the plume. Thus, the ratio of the moles of O_3 to the moles of NO_X gives the ratio of NO_2/NO_X that is formed after the NO_X leaves the stack. The equation used in the algorithm to derive the ratio of NO_2/NO_X gas combustion is:

NO_2/NO_X = (moles O_3/ moles NO_X) + 0.10

An initial NO_2/NO_X ratio of 0.1 for the back-up generators was assumed for the purposes of this assessment. A ratio of 0.2 was used for the gas turbines operating as OCGT.

A background ozone concentration of 55 µg/m^3 was used in the modelling assessment, based on a review of background ozone data for Zone D sites over the period 2019 – 2023 (EPA, 2024a).

In relation to the annual average NO_2 background, the ambient background concentration (see Section 8.3.2.1) was added directly to the process concentration with the short-term peaks assumed to have an ambient background concentration of twice the annual mean background concentration.

8.2.4.2.6 Methodology for Modelling of Ecology Impacts

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Nitrogen and Acid Deposition Methodology

In order to consider the effects of nitrogen and acid deposition owing to emissions from the facility on the designated habitat sites, the maximum annual mean NO_2 predicted environmental concentrations must be converted firstly into a dry deposition flux using the equation below which is taken from UK Environment Agency publication *AGTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air* (UKEA, 2014):

Dry deposition flux ($\mu g/m^2/s$) = ground-level concentration ($\mu g/m^3$) x deposition velocity (m/s)

The deposition velocities for NO_2 are outlined in AQTAG06 (UKEA, 2014) and shown below in Table 8.10. The dry deposition flux is then multiplied by conversion factors shown in Table 8.10 (taken from AQTAG06 (UKEA, 2014)) to convert it to a nitrogen (N) deposition flux (kg/ha/yr), and to an acid deposition flux (keq/ha/yr).

Table 8.10 Dry Deposition Fluxes for NO_2

Chemical Species	Habitat Type	Recommended Deposition Velocity (m/s)	Nitrogen Deposition Conversion factor $\mu g/m^2/s$ to kg/ha/yr	Acid Deposition Conversion factor $\mu g/m^2/s$ to keq/ha/yr
NO_2	Grassland	0.0015	95.9	6.84

8.2.4.2.7 Process Emissions

The proposed development will have a number of air emissions associated with the Technology Park. The various emission points are discussed in detail below.

Power Generation Facility

The Power Generation Facility (PGF) or energy centre will include 16 no. gas turbines which will operate as open-cycle gas turbines (OCGTs). The PGF will be developed within the site to primarily operate as a grid supporting asset with the ability to fulfil the current and proposed future CRU requirements to support the information communication technology (ICT) facilities by providing onsite dispatchable generation [equivalent to/ greater than the ICT facility buildings import capacity]. The intention is to obtain a grid connection to power the ICT facility buildings. However, to provide for a worst-case scenario where there is a delay in obtaining the grid connection, the continuous operation of the OCGTs to temporarily power the ICT facility buildings pending a grid connection has been assessed.

The 16 no. OCGTs will each have an associated 30 m (from FFL) high flue.

The OCGTs have been modelled as operating 24 hours per day, 365 days per year as a conservative approach to provide for a worst-case scenario where continuous operation of the OCGTs is required to support the grid.

In addition to the OCGT, there are also 7 no. black-start generators associated with the PGF. Each generator has an associated stack at 4.97 m above ground level. The purpose of a black start generator system is to provide auxiliary power to the start-up of the GT units. It is called a "black start" generator because it is capable of starting up and restoring power to a completely "black" or non-functioning system. The black start generators do not operate in normal operation and are only required to provide electric power to start up the GT.

These generators will be tested on a scheduled basis throughout the year to ensure they are in good working order. This has been incorporated into the air model as each generator is tested individually, for 1 hour, once per month at 100% load. In reality the testing may occur less frequently than this.

The process emissions used in the air dispersion modelling assessment for the 16 no. OCGT and 7 no. black-start generators are detailed in Table 8.11.

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Information Communication Technology (ICT) Facilities

In addition to the PGF there are also proposed to be 3 no. ICT facility buildings in the Technology Park. Each of the ICT facilities includes 20 no. back-up generators to provide power in an emergency scenario when there is a power outage on-site. There will be 60 no. back-up generators in total across the 3 no. ICT facility buildings. Each of the back-up generators has an associated 25 m (from FFL) flue.

During typical day-to-day operations the back-up generators will operate for testing purposes only, to ensure they remain in good working order. For the purposes of the air modelling assessment the back-up generators have been modelled for testing purposes for 1 hour per week, at 100% load, 1 generator at a time, sequentially.

In addition to normal testing operations, a hypothetical 72 hours of emergency operations for the 60 no. back-up generators has been included in the air modelling assessment as per the USEPA methodology in Section 8.2.4.2.1.

The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the individual emergency back-up generators.

The back-up generators are for emergency back-up only and are not anticipated to operate in excess of 500 hours per annum. Therefore, the back-up generators as proposed are exempt from complying with the ELVs subject to Section 13(3) of the Medium Combustion Plant (MCP) Regulations.

The process emissions used in the air dispersion modelling assessment for the 60 no. back-up generators are detailed in Table 8.11.

Operational Scenarios

The Proposed Operations scenario was developed for the purposes of the air modelling assessment to allow for the maximum or worst-case likely impacts in terms of air quality from the proposed development. The naming of the scenarios is applicable to the modelling assessment and are not representative of exact real-world operational scenarios. The Proposed Operations scenario consists of the following types of emissions:

- **Normal Operations**

  - Continuous operation of the 16 no. OCGTs.
  - Testing of the back-up generators on liquid fuel:
    - For the purposes of this modelling assessment each back-up generator has been conservatively modelled for testing purposes as operating at 100% load for one hour each week, individually and consecutively. All testing is assumed to occur between 8am – 5pm Monday to Friday only.

- **Emergency Operations**

  - There is potential for the back-up generators to operate in an emergency scenario should there be an interruption to the power supply to the site. In this case back-up generators will operate on liquid fuel until the power is restored. A total of 72 hours of emergency operations have been included in the air modelling assessment.

Table 8.11 Summary of proposed process emission information for the technology park.

Stack Reference	Flue Height Above Ground Level (m)	Exit Diameter (m)	Operations	Hours of Operations	Temp (K)	Volume Flow (Nm^3/hr) [a]	Exit Velocity (m/sec actual)	NO_X	
								Conc. (mg/Nm^3) [a]	Mass Emission (g/s)
Gas Turbines in PGF (as OCGTs)	30	2.00	Continuous	8,760	765	159,484	28.85	19	0.82
Black-Start Generators in PGF	4.97	0.40	Testing	1 hour per month	823.15	18,288	67.11	1,336	1.70
Back-up Generators in ICTF	25	0.65	Testing	1 hour per week	738.15	35,152	38.42	148 [b]	1.44
			Emergency	72	738.15	35,152	38.42	148 [b]	0.01[c]

a. Combustion emissions referenced to 273.15 K, 101.3 Pa, dry gas and 15% oxygen.
b. Back-up generators will include a NO_X reduction system, such as selective catalytic reduction (SCR) to reduce NO_X concentrations by 90%.
c. Emission rate factored by 72/8760 to represent emergency hours of operation using USEPA methodology.

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The potential for cumulative impact of the emissions from the proposed development with Industrial Emissions (IE) licenced or Integrated Pollution Control (IPC) installations has been considered, in line with the methodology of AG4 (EPA, 2020). The closest IPC or IE licenced facilities are over 6 km from the proposed development. At this distance it is unlikely that the emission plumes from the proposed development and the licenced sites would significantly interact. Therefore, the potential for cumulative impacts is not predicted and a detailed cumulative air dispersion modelling assessment has been scoped out.

8.2.4.3 Operational Phase Renewable Energy Production

The indirect impacts to air quality from savings in nitrogen oxides (NO_X) emissions arising from the production of electricity using renewable sources (solar panels) were calculated and compared against those produced using non-renewable sources. The calculations were carried out using data published by the EPA in relation to NO_X emissions from non-renewable energy sources as well as published capacity factors for solar power generation from Eirgrid.

Ireland's Air Pollutant Emissions 1990 – 2030 (EPA, 2023) report states that a total of 98.21 kt of NO_X was emitted in 2021 (the most recent year data is available for). A total of 8.7% of these emissions were attributable to power generation. This results in a total of 8,543 tonnes of NO_X from power generation.

Eirgrid in their report *Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology* (Eirgrid, 2024) state a capacity factor of 13.3% for solar power generation in the southern region of the country.

The proposed solar park will generate 29 MW of renewable electricity per annum.

The above figures from the EPA and Eirgrid were used in the current assessment to quantify the NO_X emissions savings from the solar park element of the proposed development annually. The results were compared against the 2030 national air emissions target of 40.6kt (Table 8.6).

8.2.5 Forecasting Methods and Difficulties Encountered

There were no difficulties encountered when completing this assessment.

8.3 Receiving Environment

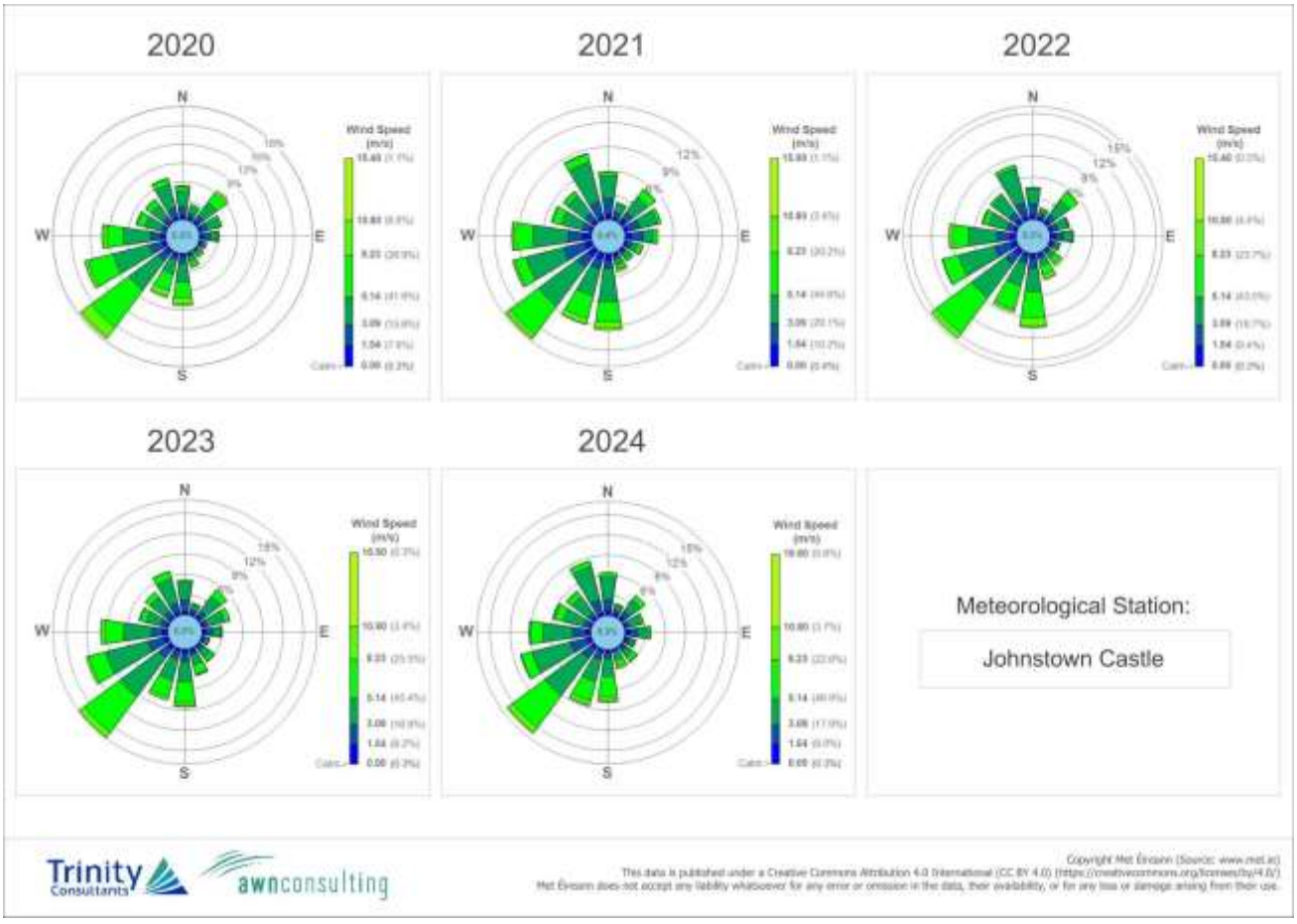
8.3.1 Meteorological Data

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A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Johnstown Castle meteorological station, which is located approximately 52 km north-east of the site. Johnstown Castle meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 8.3). For data collated during five representative years (2020 – 2024), the predominant wind direction is south-westerly (Met Éireann, 2025).

Figure 8.3 Wind Roses for Johnstown Castle Meteorological Station



8.3.2 Baseline Air Quality

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A background concentration is typically added to the modelled process contribution to account for emission sources not included in the dispersion model.

Background concentrations representative of the area of the proposed development are derived from ambient air quality monitoring undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2023*" (EPA, 2024). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2024).

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2024). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D. In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA, 2024).

Continuous monitoring by the EPA is carried out at a number of monitoring stations within Zone D; these include urban background sites, roadside (traffic) sites, suburban background sites and rural background sites.

It is necessary to select monitoring stations that are representative of the site location. Not all monitoring stations are considered suitable for determining background pollutant concentrations and must be reviewed on a case-by-case basis to determine the most appropriate EPA monitoring sites for the current assessment.

The EPA, on their website (EPA, 2024), state that background sites generally represent overall area-wide exposure more closely than roadside sites. Roadside monitoring sites are heavily influenced by traffic emissions and are not considered representative of area-wide pollutant levels. The purpose of this assessment is to determine the predicted pollutant concentrations over a wide area, therefore roadside monitoring stations were not considered appropriate.

The full suite of EPA Zone D background monitoring stations were therefore reviewed to determine those that were most appropriate to estimate background pollutant levels for the area of the proposed development. It was considered appropriate to utilise the rural background monitoring sites as these were considered most representative of the proposed development location.

8.3.2.1 NO_2

Long-term NO_2 monitoring was carried out at the Zone D rural background locations of Emo Court, Co. Laois and Kilkitt, Co. Monaghan which are considered representative of the area of the proposed development. Monitoring data for the period 2019 – 2023 (EPA, 2024) has been reviewed in order to inform the assessment (Table 8.12).

The NO_2 annual average concentrations over the 2019 – 2023 period for the rural background locations of Emo Court and Kilkitt ranged from 2 – 5 µg/m^3. Therefore, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. Additionally, there were no exceedances of the 1-hour limit value of 200 µg/m^3 at either location in the 2019 – 2023 period. A conservative estimate of the background NO_2 concentration, for the region of the proposed development is therefore 5 µg/m^3, as derived from these long-term trends.

Table 8.12 Trends in Air Quality – Nitrogen Dioxide (NO_2)

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Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Emo Court, Co. Laois	Annual Mean NO_2 (µg/m^3)	4	3	4	3	2
	1-hr Mean NO_2 (as 99.8th%ile) (µg/m^3)	28	23	28	38	-
	1-hr Mean NO_2 (as 99.97th%ile) (µg/m^3)	-	28	53	109	-
	1-hr Mean NO_2 values >200 µg/m^3	-	0	0	0	0
	24-hr Mean NO_2 (as 95.1st%ile) (µg/m^3)	-	9	8	9	-
	24-hr Mean NO_2 values >50 µg/m^3	-	0	0	0	-
Kilkitt, Co. Monaghan	Annual Mean NO_2 (µg/m^3)	5	2	2	2	2
	1-hr Mean NO_2 (as 99.8th%ile) (µg/m^3)	42	13	11	15	-
	1-hr Mean NO_2 (as 99.97th%ile) (µg/m^3)	-	16	14	19	-
	1-hr Mean NO_2 values >200 µg/m^3	-	0	0	0	0
	24-hr Mean NO_2 (as 95.1st%ile) (µg/m^3)	-	4	5	5	-
	24-hr Mean NO_2 values >50 µg/m^3	-	0	0	0	-
Annual Mean NO_2 (µg/m^3)	2008/50/EC Limit Value (applicable until 2030)	40				
	2024/2881 Limit Value (to be attained by 2030)	20				
1-hr Mean NO_2 (as 99.8th%ile) (µg/m^3)	2008/50/EC Limit Value (applicable until 2030)	200				
1-hr Mean NO_2 values >200 µg/m^3		No more than 18 exceedances				
1-hr Mean NO_2 (as 99.97th%ile) (µg/m^3)	2024/2881 Limit Value (to be attained by 2030)	200				
1-hr Mean NO_2 values >200 µg/m^3		No more than 3 exceedances				
24-hr Mean NO_2 (as 95.1st%ile) (µg/m^3)	2024/2881 Limit Value (to be attained by 2030)	200				
24-hr Mean NO_2 values >50 µg/m^3		No more than 18 exceedances				

8.3.2.2 PM_{10}

Long-term PM_{10} monitoring was carried out at the Zone D rural background locations of Kilkitt, Co. Monaghan and Claremorris, Co. Mayo which are considered representative of the area of the proposed development. Monitoring data for the period 2019 – 2023 (EPA, 2024) has been reviewed in order to inform the assessment (Table 8.13).

The PM_{10} annual average concentrations over the 2019 – 2023 period for rural background locations of Kilkitt and Claremorris ranged from 7 – 11 µg/m^3. Therefore, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. In addition, there was at most 1 exceedance (in Kilkitt) of the 24-hour limit value of 50 µg/m^3 in 2019, albeit 35 exceedances are permitted per year (EPA, 2024). A conservative estimate of the background PM_{10} concentration, for the region of the proposed development is therefore 8 µg/m^3, as derived from these long-term trends.

Table 8.13 Trends in Air Quality – PM_{10}

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
	Annual Mean PM_{10} (µg/m^3)	7	8	8	9	7

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Kilkitt, Co. Monaghan	24-hr Mean PM_{10} (as 90.4th%ile) (µg/m^3)	13	14	-	14	-
	24-hr Mean > 50 µg/m^3 (days)	1	0	-	0	0
	24-hr Mean PM_{10} (as 95.1st%ile) (µg/m^3)	-	17	-	19	-
	24-hr Mean PM_{10} values > 45 µg/m^3	-	0	-	0	-
Claremorris, Co. Mayo	Annual Mean PM_{10} (µg/m^3)	11	10	10	8	8
	24-hr Mean PM_{10} (as 90.4th%ile) (µg/m^3)	20	16	13	13	-
	24-hr Mean > 50 µg/m^3 (days)	0	0	0	0	0
	24-hr Mean PM_{10} (as 95.1st%ile) (µg/m^3)	-	19	14	17	-
	24-hr Mean PM_{10} values > 45 µg/m^3	-	0	0	0	-
Annual Mean PM_{10} (µg/m^3)	2008/50/EC Limit Value (applicable until 2030)	40				
	2024/2881 Limit Value (to be attained by 2030)	20				
24-hr Mean PM_{10} (as 90.4th%ile) (µg/m^3)	2008/50/EC Limit Value (applicable until 2030)	50				
24-hr Mean PM_{10} values > 50 µg/m^3		No more than 35 exceedances				
24-hr Mean PM_{10} (as 95.1st%ile) (µg/m^3)	2024/2881 Limit Value (to be attained by 2030)	45				
24-hr Mean PM_{10} values > 45 µg/m^3		No more than 18 exceedances				

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8.3.2.3 $PM_{2.5}$

Long-term $PM_{2.5}$ monitoring was carried out at the Zone D rural background locations of Claremorris, Co. Mayo and Shannon Estuary/Askeaton, Co. Limerick which are considered representative of the area of the proposed development. Monitoring data for the period 2019 – 2023 (EPA, 2024) has been reviewed in order to inform the assessment (Table 8.14).

The $PM_{2.5}$ annual average concentrations over the 2019 – 2023 period ranged from 4 – 8 µg/m^3. Therefore, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 25 µg/m^3. A conservative estimate of the background $PM_{2.5}$ concentration, for the region of the proposed development is therefore 5 µg/m^3, as derived from these long-term trends.

Table 8.14 Trends in Air Quality – $PM_{2.5}$

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Claremorris, Co. Mayo	Annual Mean $PM_{2.5}$ (µg/m^3)	4	5	8	6	5
	24-hr Mean $PM_{2.5}$ (as 95.1st%ile) (µg/m^3)	-	11	14	14	-
	24-hr Mean $PM_{2.5}$ values > 25 µg/m^3	-	1	0	2	-
Shannon Estuary/Askeaton, Co. Limerick	Annual Mean $PM_{2.5}$ (µg/m^3)	-	4	6	5	5
	24-hr Mean $PM_{2.5}$ (as 95.1st%ile) (µg/m^3)	-	7	12	12	-

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
	24-hr Mean $PM_{2.5}$ values > 25 µg/m³	-	0	2	1	-
Annual Mean $PM_{2.5}$ (µg/m³)	2008/50/EC Limit Value (applicable until 2030)	25				
	2024/2881 Limit Value (to be attained by 2030)	10				
24-hr Mean $PM_{2.5}$ (as 95.1st%ile) (µg/m³)	2024/2881 Limit Value (to be attained by 2030)	25				
24-hr Mean $PM_{2.5}$ values > 25 µg/m³		No more than 18 exceedances				

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8.3.2.4 Summary

Based on the above information the air quality in rural Zone D locations, such as the Kilmeaden area is generally good, with concentrations of the key pollutants generally well below the current limit values set out in Directive 2008/50/EC. The current pollutant concentrations at these monitoring sites are also in compliance with the 2030 limit values set out in Directive (EU) 2024/2881 and the clean air strategy, however, concentrations are approaching the limit values at certain locations. Further measures will be needed at a national scale to reduce air pollution in future years. The EPA have indicated that road transport emissions are contributing to increased levels of NO_2 with the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2024).

8.3.2.5 Sensitive Designated Habitats

Background concentrations for NO_X, and nitrogen and acid deposition at the most impacted modelled designated habitats as identified through the IN2 screening process described in Section 8.2.2.2.3, were derived from the 1 km grid square concentrations provided on the Air Pollution Information System (APIS) website (APIS, 2025), in line with UKEA (2014) and UK Defra (2022) guidance. The background concentrations for the relevant sites are shown in Table 8.15. The background concentrations are added directly to the modelled process contributions to give a total predicted environmental concentration.

The grid average concentrations were used for the nationally designated pNHAs. In relation to the Lower River Suir SAC, the maximum background concentration for the area in closest proximity to the proposed development was used.

Table 8.15 Background Concentrations for NO_X, Nitrogen and Acid Deposition

Sensitive Designated Habitat	NOx (µg/m³)	Nitrogen Deposition (kg/ha/yr)	Acid Deposition (keq/ha/yr)
Lower River Suir SAC	4.7	6.8	0.5
Carrickavrantry Reservoir pNHA	2.31	7.70	0.58
Grannyferry pNHA	4.05	6.08	0.44
Islandtarnsey Fen pNHA	2.35	6.3	0.77
Lough Cullin pNHA	3.15	7.24	0.53

8.3.3 Sensitivity of the Receiving Environment

8.3.3.1 Construction Phase

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In line with the UK Institute of Air Quality Management (IAQM) guidance document *Guidance on the Assessment of Dust from Demolition and Construction* (2024), prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be assessed, as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties (where people are likely to spend the majority of their time), schools and hospitals. Commercial premises and places of work are regarded as medium sensitivity and places where people are present for short periods, or do not expect a high level of amenity, are regarded as low sensitivity.

Table 8.16 outlines the criteria for determining the sensitivity of the area to dust soiling and dust-related human health effects as per the IAQM guidance (IAQM, 2024).

Table 8.16 Criteria for Determining the Sensitivity of the Area

Sensitivity of the Area to Dust Soiling Effects on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance from Source (m)**			
		<20	**<50**	**<100**	**<250**
High	>100	High	High	Medium	Low
	10 – 100	**High**	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low
Sensitivity of the Area to Human Health Impacts					
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**		
			<20	**<50**	**<100**	**<250**
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10 – 100	**Low**	Low	Low	Low
		1 – 10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

In terms of receptor sensitivity to dust soiling, there are approximately 15 no. high sensitivity residential properties within 20 m of the site boundary (shown in Figure 8.4). Therefore, the overall sensitivity of the area to dust soiling impacts is **high** based on the IAQM criteria outlined in Table 8.16.

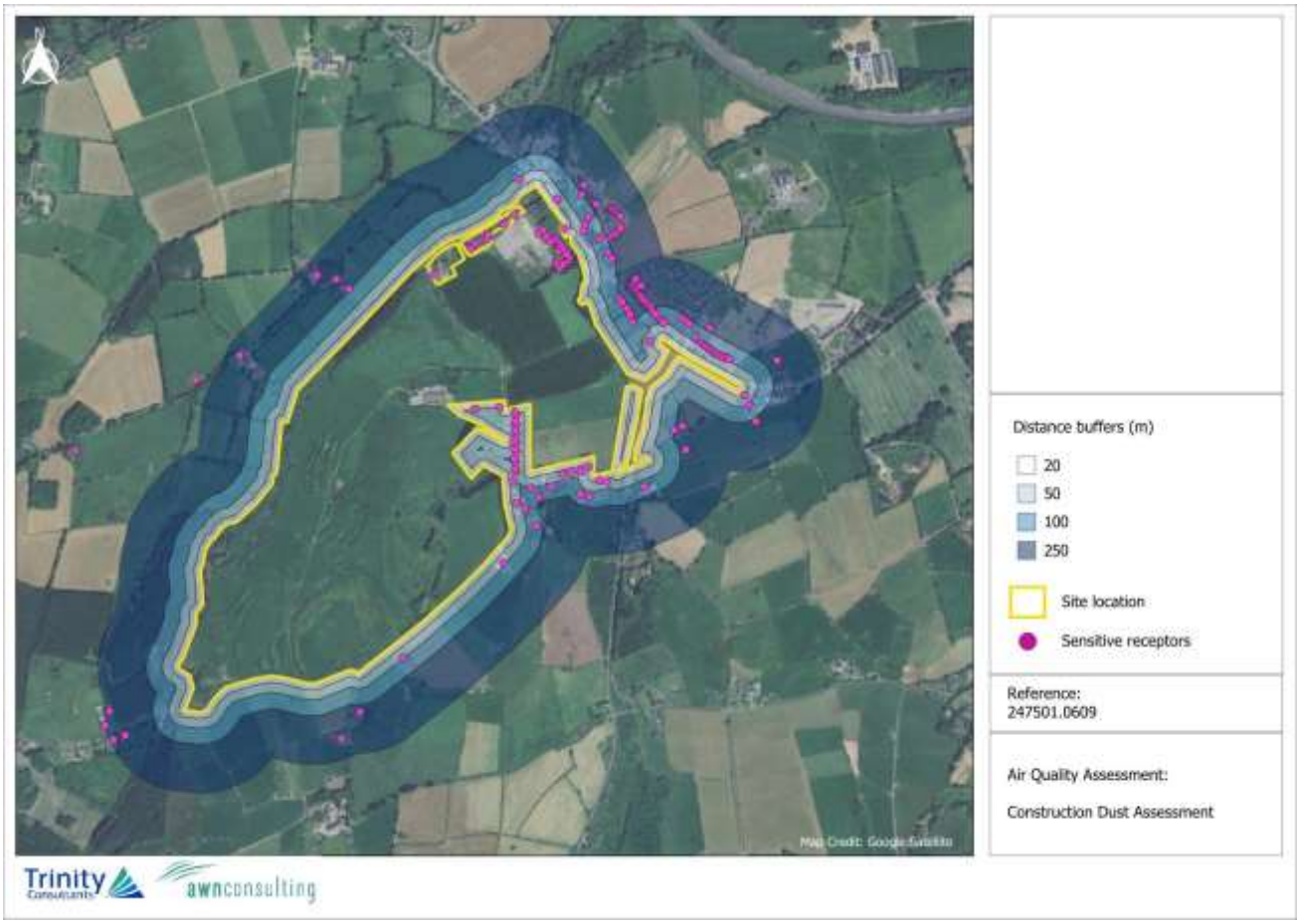
In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 8 µg/m^3 and there are approximately 15 no. high sensitivity residential properties within 20 m of the site boundary (see Figure 8.4). Based on the IAQM criteria outlined in Table 8.16, the worst-case sensitivity of the area to dust-related human health impacts is **low**.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the

photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site, and 50 m from site access roads, up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present. There are no designated ecological sites within 250 m of the proposed development therefore, as per the IAQM guidance (2024) there is no potential for significant impacts to vegetation from construction dust emissions.

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Figure 8.4 Sensitive Receptors within 20m, 50m, 100m and 250m of Site Boundary



8.3.3.2 Operational Phase

8.3.3.2.1 Air Quality and Traffic Assessment

The impact to air quality as a result of changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (TII, 2022a) states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling. The TII criteria state that receptors within 200 m of affected road links should be assessed; roads which are greater than 200 m from receptors will not affect pollutant concentrations at that receptor.

The TII guidance (2022) defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term-accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours. A total of 8 no. high sensitivity residential receptors (R1 - R8) were included in the modelling assessment (see Figure 8.5).

Figure 8.5 Location of Sensitive Receptors used in Operational Phase Air Quality Traffic Assessment

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8.3.3.2.2 Air Dispersion Model

Human Receptors

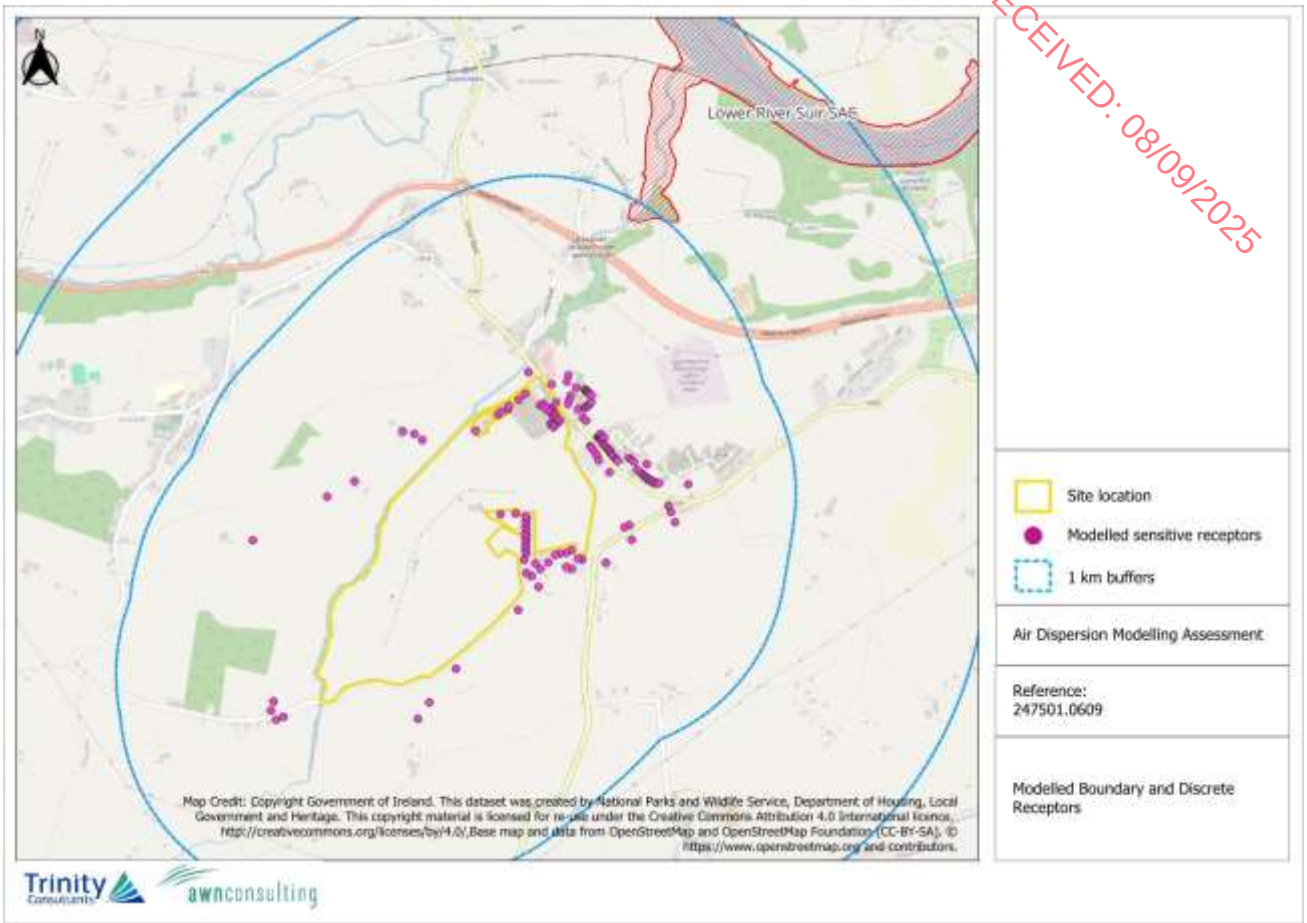
The modelling has incorporated a variety of receptors, including a gridded receptor network, site boundary receptors, and individual discrete receptors representing specific residential properties. Receptors were modelled at 1.5 m to represent breathing height.

Three receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localized "hot-spots" were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. An outer grid measured 10 x 10 km with the site at the centre and with concentrations calculated at 500 m intervals. The middle grid measured 6 x 6 km with concentrations calculated at 300 m interval. A smaller inner grid measured 3 x 3 km with concentrations calculated at 75 m intervals.

Boundary receptor locations were also placed along the boundary of the site, at 25 m intervals giving a total of 3,017 calculation points for the model.

The impact of the emission sources was also measured at nearby sensitive receptors (all residential) which were added to the model as discrete receptors (see Figure 8.6).

Figure 8.6 Modelled Boundary and Discrete Receptors



Ecology Receptors

The impact of emissions of NO_X and nutrient and acid deposition within 15 km of the facility on ambient ground level concentrations within the following designated habitat sites was assessed using AERMOD. The 15 km distance was selected to align with the typical approach for an Appropriate Assessment (AA) and based on maximum extent of the impact zone from the air emissions onsite. After 15 km, the ambient air concentration of NO_X and nutrient and acid deposition due to emissions from the proposed development are considered imperceptible.

Table 8.17 Ecology Receptors

Special Area of Conservation (SAC)	Special Protection Area (SPA)	Proposed Natural Heritage Area (pNHA)	Natural Heritage Area (NHA)
Lower River Suir SAC	Mid-Waterford Coast SPA	Ballin Lough (Waterford) pNHA	n/a
Tramore Dunes and Backstrand SAC	Tramore Back Strand SPA	Ballyvoyle Head To Tramore pNHA	
		Belle Lake pNHA	
		Carrickavrantry Reservoir pNHA	
		Castlecraddock Bog pNHA	
		Fennor Bog pNHA	
		Fiddown Island pNHA	
		Grannyferry pNHA	
		Islandtarnsey Fen pNHA	

Special Area of Conservation (SAC)	Special Protection Area (SPA)	Proposed Natural Heritage Area (pNHA)	Natural Heritage Area (NHA)
		Kilbarry Bog pNHA	
		King's Channel pNHA	
		Lissaviron Bog pNHA	
		Lough Cullin pNHA	
		Lower River Suir (Coolfinn, Portlaw) pNHA	
		Portlaw Woods pNHA	
		Tibberaghny Marshes pNHA	
		Tramore Dunes And Backstrand pNHA	

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Dispersion modelling of relevant pollutant emissions from all emission points at the proposed development were predicted at receptors within the designated sites for all five years of meteorological data modelled. With receptor spacing of 500 m, 817 discrete receptors were modelled in total within the sensitive ecosystems. Ecological receptors were measured at 0 m.

8.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development particularly in areas where likely impacts to air quality may occur. The information presented in this section is informed by the project design, but it is not a complete description of the proposed development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the proposed development, please refer to Chapter 2 of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

8.4.1 Construction Phase

The proposed works will comprise construction of a proposed village centre, a technology park – including a Power Generation Facility (PGF) or 'energy centre' and 3 no. ICT facilities, as well as a proposed renewable energy solar park and all associated elements. The key civil engineering works which will have a likely impact on air quality during construction are summarised below:

- During construction, an amount of soil will be generated as part of the site preparation works and during excavation for installation of foundations, drainage services and ancillary infrastructure.
- Infilling and landscaping will be undertaken. Spoil generated during site preparation will be re-used in landscaping and levelling of the site where possible.
- Temporary storage of construction materials.
- Construction traffic accessing the site will emit air pollutants during transport.

As outlined in Section 8.6.1, a dust management plan will be finalised for the construction phase of the project to manage dust and protect nearby sensitive receptors.

8.4.2 Operational Phase

The key works which will have a likely impact on air quality during operation of the proposed development are summarised below:

- The operation of the gas turbines and back-up generators will release air pollutant emissions (primarily NOx emissions).
- Road traffic accessing the site will emit air pollutants and greenhouse gases.

8.5 Likely Significant Effects of the Proposed Development

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8.5.1 Do Nothing

In the Do Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

The Do Nothing scenario associated with the operational phase traffic is assessed within Section 8.5.3.1 and it was found to be ***direct, long-term, neutral*** and ***not significant***.

8.5.2 Construction Phase

8.5.2.1 Construction Dust Assessment

The greatest likely impact on air quality during the construction phase of the proposed development is from construction dust emissions. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Johnstown Castle meteorological data indicates that the prevailing wind direction is south-westerly and wind speeds are generally moderate in nature (see Section 8.3.1). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Cork Airport meteorological station, the closest meteorological monitoring site with recent 30-year average data, indicates that on average 218 days per year have rainfall over 0.2 mm (Met Eireann, 2025) and therefore it can be determined that 76% of the time dust generation will be reduced due to natural meteorological conditions.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 8.3.3.1). The major dust generating activities are divided into four types within the IAQM (2024) guidance to reflect their different likely impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

8.5.2.1.1 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity has been determined below for the proposed development using the criteria in Table 8.7.

- Demolition: The dust emission magnitude for the demolition activities can be categorised as 'small' due to the volume of buildings involved, with the potential for less than 12,000 m^3 of buildings to be demolished and demolition activities <6 m above ground.
- Earthworks: The dust emission magnitude for the proposed earthwork activities can be classified as large as the total site area is greater than 110,000 m^2.
- Construction: The dust emission magnitude for the proposed construction activities can be classified as large as a worst-case as the total volume of buildings to be constructed will be greater than 75,000 m^3.
- Trackout: The dust emission magnitude for the proposed trackout can be classified as medium, as there will be between 20 – 50 outward HGV movements per day during the construction phase of the proposed development.

8.5.2.1.2 Determining the Risk of Dust Impacts

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Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling and dust-related human health effects (see Section 8.3.3.1). The level of risk associated with each activity is determined using the criteria in Table 8.8. The overall risk of dust impacts from the construction works is shown in Table 8.18 for each category.

- Demolition: As the overall sensitivity of the area to dust soiling is high, when combined with a small dust emission magnitude, this produces an overall medium risk of dust impacts (as per the criteria in Table 8.8). As the overall sensitivity of the area to dust-related human health effects is low, this results in a negligible risk of dust-related human health effects (as per the criteria in Table 8.8).
- Earthworks: As the overall sensitivity of the area to dust soiling is high, when combined with a large dust emission magnitude, this produces an overall high risk of dust soiling impacts (as per the criteria in Table 8.8). As the overall sensitivity of the area to dust-related human health effects is low, this results in a low risk of dust-related human health effects (as per the criteria in Table 8.8).
- Construction: Combining the large dust emissions magnitude for the construction activities with the high sensitivity to dust soiling results in a high risk of dust soiling impacts using the criteria in Table 8.8. There is an overall low risk of dust-related human health impacts as a result of the proposed construction activities.
- Trackout: Combining the medium dust emission magnitude for the trackout activities with the high sensitivity to dust soiling results in a medium risk of dust impacts using the criteria in Table 8.8. There is an overall low risk of dust-related human health impacts as a result of the proposed trackout activities.

There is at most a high risk of dust soiling impacts and a low risk of dust-related human health impacts associated with the proposed works. As a result, best practice dust mitigation measures associated with high-risk works will be implemented to ensure there are no likely significant effects at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be ***direct, short-term, negative*** and ***slight*** which is overall ***not significant.***

Table 8.18 Risk of Dust Impacts used to Define Site-Specific Mitigation

Receptor	Receptor Sensitivity	Dust Emission Magnitude	Risk of Dust-Related Impacts
Demolition			
Dust Soiling	High	Small	Medium Risk
Human Health	Low		Negligible Risk
Earthworks			
Dust Soiling	High	Large	High Risk
Human Health	Low		Low Risk
Construction			
Dust Soiling	High	Large	High Risk
Human Health	Low		Low Risk
Trackout			
Dust Soiling	High	Medium	Medium Risk
Human Health	Low		Low Risk

8.5.2.2 Construction Traffic Assessment

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There is also the potential for traffic emissions to affect air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as described in Section 8.2.3.2.

It can therefore be determined that the construction stage traffic will have a ***direct, short-term,*** and ***neutral*** impact on air quality, which is overall ***not significant*** in EIA terms.

8.5.3 Operational Phase

8.5.3.1 Operational Phase Traffic Assessment

The likely impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the proposed development. The traffic data has included specific cumulative developments within the area to provide for a worst-case assessment and to assess likely cumulative impacts (see Traffic and Transport Assessment and Chapter 13 - Material Assets (Traffic & Transport) for further details).

The traffic data includes the Do Nothing (DN) scenario and Do Something (DS) scenario. The impact of NO_2, PM_{10} and $PM_{2.5}$ emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the impacted road links. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

The TII guidance PE-ENV-01106 (TII, 2022) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do Nothing' scenario, which assumes that the proposed development is not in place in future years, to determine the degree of impact.

Traffic related air emissions have the potential to impact air quality which can affect human health. The following details the results of the air dispersion modelling assessment of traffic emissions to determine the impact to human health. The predicted pollutant concentrations have been compared against the ambient air quality limit values set out in Table 8.1. The limit values set out in Directive 2008/50/EC and the Ambient Air Quality Standards Regulations 2022 are applicable to the Opening Year 2029. The limit values set out under Directive (EU) 2024/2881 are applicable to the Design Year 2044.

NO_2

The results of the NO_2 modelling are shown in Table 8.19. In the Opening Year 2029, predicted annual mean concentrations of NO_2 are in compliance with the annual mean limit value of 40 µg/m^3 set out under Directive 2008/50/EC, reaching at most 20% of the limit. In addition, the TII guidance (2022) states that the hourly limit value for NO_2 of 200 µg/m^3 is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m^3. As predicted NO_2 concentrations are significantly below 60 µg/m^3 (Table 8.19), it can be concluded that the short-term NO_2 limit value will be complied with at all receptor locations. Some increases in NO_2 concentrations are predicted at the worst-case receptors assessed in the Opening Year when compared with the Do-Nothing scenario (see Table 8.19). Concentrations are predicted to increase by at most 0.42 µg/m^3 at receptor R6. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 1.05% at receptor R6. All other receptors in the area will experience similar or lesser impacts and all increases are considered 'neutral' as per the TII criteria in Table 8.3.

In the Design Year 2044, predicted annual mean NO_2 concentrations are in compliance of the limit value of 20 µg/m^3 set out under Directive (EU) 2024/2881, at the worst-case receptors assessed, reaching at most

34% of the limit. The proposed development will result in a 'neutral' increase in NO_2 concentrations according to the TII significance criteria in Table 8.3, with concentrations increasing by at most 0.16 µg/m^3 as a result of the proposed development (at receptor R5, see Table 8.19), which is an increase of 0.80% when compared with the applicable annual mean limit value for NO_2 .Therefore, the impact of the proposed development on NO_2 concentrations is ***neutral***.

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Table 8.19 Predicted Annual Mean NO_2 Concentrations (µg/m^3)

Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	5.4	14%	5.5	14%	0.06	0.15%	Neutral
R2	7.6	19%	7.9	20%	0.29	0.73%	Neutral
R3	6.9	17%	7.1	18%	0.21	0.53%	Neutral
R4	7.1	18%	7.4	19%	0.26	0.65%	Neutral
R5	5.0	13%	5.3	13%	0.29	0.73%	Neutral
R6	7.6	19%	8.0	20%	0.42	1.05%	Neutral
R7	7.6	19%	7.8	19%	0.13	0.33%	Neutral
R8	7.7	19%	7.9	20%	0.11	0.27%	Neutral
Receptor	**Impact Design Year**						
	DN	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	5.3	26%	5.3	27%	0.02	0.10%	Neutral
R2	6.7	34%	6.8	34%	0.07	0.35%	Neutral
R3	6.2	31%	6.3	31%	0.05	0.25%	Neutral
R4	6.4	32%	6.5	32%	0.07	0.35%	Neutral
R5	5.0	25%	5.2	26%	0.16	0.80%	Neutral
R6	6.6	33%	6.8	34%	0.12	0.60%	Neutral
R7	6.6	33%	6.7	33%	0.06	0.30%	Neutral
R8	6.7	33%	6.7	34%	0.05	0.25%	Neutral

PM_{10}

The results of the PM_{10} modelling can be seen in Table 8.20 for the Opening Year 2029 and Design Year 2044.

In the Opening Year 2029, annual mean PM_{10} concentrations are in compliance with the annual mean limit value of 40 µg/m^3 set out under Directive 2008/50/EC reaching at most 26% of the limit. In the Design Year 2044 annual mean PM_{10} concentrations are also in compliance with the annual mean limit value of 20 µg/m^3 set out under Directive (EU) 2024/2881 reaching at most 53% of the limit. In addition, the proposed development will not result in any days of exceedance of the daily PM_{10} limit value (Table 8.1) in both the opening and design years.

The changes in PM_{10} concentrations as a result of the proposed development can be assessed relative to the 'Do Nothing' (DN) levels. In the Opening Year 2029 annual PM_{10} concentrations will increase by at most 0.29 µg/m^3 at receptor R6, this is a 0.73% increase when compared with the annual mean limit value of 40 µg/m^3. All other receptors in the area will experience similar or lesser impacts and all increases are considered 'neutral' as per the TII criteria in Table 8.3.

In the Design Year 2044 the proposed development will result in a maximum increase of 0.19 µg/m^3 at receptor R5, which is a 0.95% increase when compared with the annual mean limit of 20 µg/m^3. The changes in concentrations in the Design Year are considered '***neutral'*** based on the TII criteria in Table 8.3.

Table 8.20 Predicted Annual Mean PM_{10} Concentrations (µg/m³)

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Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	8.4	21%	8.4	21%	0.04	0.10%	Neutral
R2	10.1	25%	10.3	26%	0.19	0.48%	Neutral
R3	9.5	24%	9.7	24%	0.13	0.33%	Neutral
R4	9.7	24%	9.9	25%	0.16	0.40%	Neutral
R5	8.0	20%	8.2	21%	0.20	0.50%	Neutral
R6	9.8	24%	10.1	25%	0.29	0.73%	Neutral
R7	10.1	25%	10.1	25%	0.07	0.18%	Neutral
R8	10.3	26%	10.3	26%	0.06	0.15%	Neutral
Receptor	**Impact Design Year**						
	DN	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	8.4	42%	8.4	42%	0.02	0.10%	Neutral
R1	10.5	52%	10.5	53%	0.06	0.30%	Neutral
R2	9.7	49%	9.8	49%	0.04	0.20%	Neutral
R3	10.0	50%	10.0	50%	0.05	0.25%	Neutral
R4	8.0	40%	8.2	41%	0.19	0.95%	Neutral
R5	10.0	50%	10.1	51%	0.14	0.70%	Neutral
R6	10.3	51%	10.3	52%	0.05	0.25%	Neutral
R7	10.5	52%	10.5	53%	0.05	0.25%	Neutral

$PM_{2.5}$

In relation to changes in $PM_{2.5}$ concentrations as a result of the proposed development, the results of the assessment can be seen in Table 8.21 for the modelled Opening Year 2029 and Design Year 2044.

In the Opening Year 2029, predicted annual mean concentrations of $PM_{2.5}$ are in compliance with the annual mean limit value of 25 µg/m³ set out under Directive 2008/50/EC reaching at most 25% of the limit. There is predicted to be an increase in $PM_{2.5}$ concentrations at the worst-case receptors assessed in the Opening Year when compared with the Do-Nothing scenario (see Table 8.21). Concentrations are predicted to increase by at most 0.17 µg/m³ at receptor R6. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 0.68% at receptor R6. All other receptors in the area will experience similar or lesser impacts and all increases are considered 'neutral' as per the TII criteria in Table 8.3.

In the Design Year 2044, predicted annual mean $PM_{2.5}$ concentrations are in compliance with the limit value of 10 µg/m³ set out under Directive (EU) 2024/2881 at all receptors assessed. Concentrations reach at most 65% of the annual mean limit value. The proposed development will result in a ***'neutral'*** increase in $PM_{2.5}$ concentrations according to the TII significance criteria in Table 8.3, with concentrations increasing by at most 0.11 µg/m³ as a result of the proposed development (at receptor R5, see Table 8.21), which is an increase of 1.1% when compared with the annual mean limit value of 10 µg/m³ for $PM_{2.5}$.

Table 8.21 Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	5.2	21%	5.2	21%	0.02	0.08%	Neutral
R2	6.2	25%	6.4	25%	0.11	0.44%	Neutral
R3	5.9	24%	6.0	24%	0.08	0.32%	Neutral

Receptor	Impact Opening Year						
	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R4	6.0	24%	6.1	24%	0.09	0.36%	Neutral
R5	5.0	20%	5.1	20%	0.12	0.48%	Neutral
R6	6.0	24%	6.2	25%	0.17	0.68%	Neutral
R7	6.2	25%	6.3	25%	0.04	0.16%	Neutral
R8	6.3	25%	6.4	25%	0.04	0.16%	Neutral
Receptor	**Impact Design Year**						
	DN	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	5.2	52%	5.3	53%	0.02	0.20%	Neutral
R2	6.4	64%	6.5	65%	0.03	0.30%	Neutral
R3	6.0	60%	6.0	60%	0.03	0.30%	Neutral
R4	6.1	61%	6.2	62%	0.03	0.30%	Neutral
R5	5.0	50%	5.1	51%	0.11	1.10%	Neutral
R6	6.2	62%	6.2	62%	0.08	0.80%	Neutral
R7	6.3	63%	6.3	63%	0.03	0.30%	Neutral
R8	6.4	64%	6.4	64%	0.02	0.20%	Neutral

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Significance of Predicted Changes in NO_2, PM_{10} and $PM_{2.5}$ Concentrations

As outlined in Section 8.2.2.1.4, the TII guidance (2022) states that significance of effects should be assessed based on the opening year only. Non-significant effects are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial' however, the TII guidance (2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

In relation to NO_2, PM_{10} and $PM_{2.5}$ the predicted changes in concentrations all ***'neutral'*** at the worst-case receptor assessed. Therefore, according to the TII criteria as outlined in Section 8.2.2.1.4, there are no likely significant effects on the environment as a result of predicted changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations from operational traffic.

For the purposes of this assessment, it has been assumed that the current estimated background pollutant concentrations are applicable for both the opening and design years, with no decreases in future background concentrations allowed for. There will be some decreases in background concentrations in future years, however at present there is no guidance-based methodology available for estimating future year background concentrations and therefore, as a conservative approach, the current estimated background concentrations have been applied to future years.

Due to the large uncertainty in future improvements in fleet composition and emissions, such as projected changes to vehicle registration and electric vehicle uptake, the future year emission rates utilised by the REM do not account for the full implementation of these measures. Predicted design year concentrations are therefore currently overly conservative as future emissions improvements are not fully taken into account, as well as no improvement in background concentrations being assumed. As a result the opening year predicted concentrations are the most appropriate for determining the significance of effects as per Section 8.2.2.1.4.

It can be concluded that the impact of traffic emissions on air quality and human health during the operational phase is long-term, direct, localised, negative and not significant in EIA terms.

The measures set out in the *Clean Air Strategy for Ireland* (Government of Ireland 2023) aim to work towards solutions to ensure that air pollution concentrations are reduced in order to comply with the future

changes in limit values. Ireland will need to continue to implement and develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved. The estimated background concentrations used in the assessment are the largest contribution to predicted pollutant concentrations, rather than pollutant contributions associated with the proposed development. Strategies to improve air quality at a national level in future years will contribute to reducing background concentrations and therefore it is envisioned that air quality will improve in the future.

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8.5.3.2 Air Dispersion Model

8.5.3.2.1 Human Receptors

Proposed Operations – NO_2 (USEPA Methodology)

The NO_2 modelling results indicate that ambient ground level concentrations of NO_2, detailed in Table 8.22, are in compliance with the relevant air quality standards for all modelled years at the worst-case receptor (considers boundary, gridded and sensitive receptors).

For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 77% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) at the worst-case receptor (location shown in Figure 8.7) and 48% of the annual limit value at the worst-case receptor (location shown in Figure 8.8).

The geographical variations in ground level NO_2 predicted environmental concentrations (PEC) beyond the facility boundary for the worst-case year modelled are illustrated as concentration contours in Figure 8.7 and Figure 8.8, to demonstrate the direction and extent of the emission plume. The locations of the maximum concentrations for NO_2 are close to the boundary of the site with concentrations decreasing with distance from the facility. In summary, emissions to atmosphere of NO_2 from the site will be in compliance with the ambient air quality standards which are based on the protection of the environment and human health.

The effect of proposed operations NO_2 emissions on air quality is considered ***direct, long-term, negative*** and ***not significant***.

Table 8.22 Proposed Operations – Dispersion Model Results for Nitrogen Dioxide (NO_2)

Pollutant / Year	Averaging Period	Worst Case Receptor		Concentrations (µg/m^3)				PEC as % of Limit
		Type	X,Y (UTM Zone 29 N)	PC	Back-ground	PEC	Limit Value	
NO_2 / 2020	Annual Mean	Boundary	620182, 5788015	14.0	5	19.0	40	48%
	99.8th%ile of 1-hr means	Discrete	620081, 5788176	144.7	10	154.7	200	77%
NO_2 / 2021	Annual Mean	Boundary	620149, 5788041	11.8	5	16.8	40	42%
	99.8th%ile of 1-hr means	Discrete	620081, 5788176	133.7	10	143.7	200	72%
NO_2 / 2022	Annual Mean	Boundary	620149, 5788041	12.5	5	17.5	40	44%
	99.8th%ile of 1-hr means	Discrete	620081, 5788176	122.6	10	132.6	200	66%
NO_2 / 2023	Annual Mean	Boundary	620182, 5788015	13.4	5	18.4	40	46%
	99.8th%ile of 1-hr means	Discrete	620081, 5788176	124.3	10	134.3	200	67%

Pollutant / Year	Averaging Period	Worst Case Receptor		Concentrations (µg/m³)				PEC as % of Limit
		Type	X,Y (UTM Zone 29 N)	PC	Back-ground	PEC	Limit Value	
NO_2 / 2024	Annual Mean	Boundary	620149, 5788041	12.5	5	17.5	40	44%
	99.8th%ile of 1-hr means	Discrete	620081, 5788176	118.5	10	128.5	200	64%

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Figure 8.7 Proposed Operations – Maximum 1-Hour NO_2 Concentrations (as 99.8th%ile) (µg/m³)

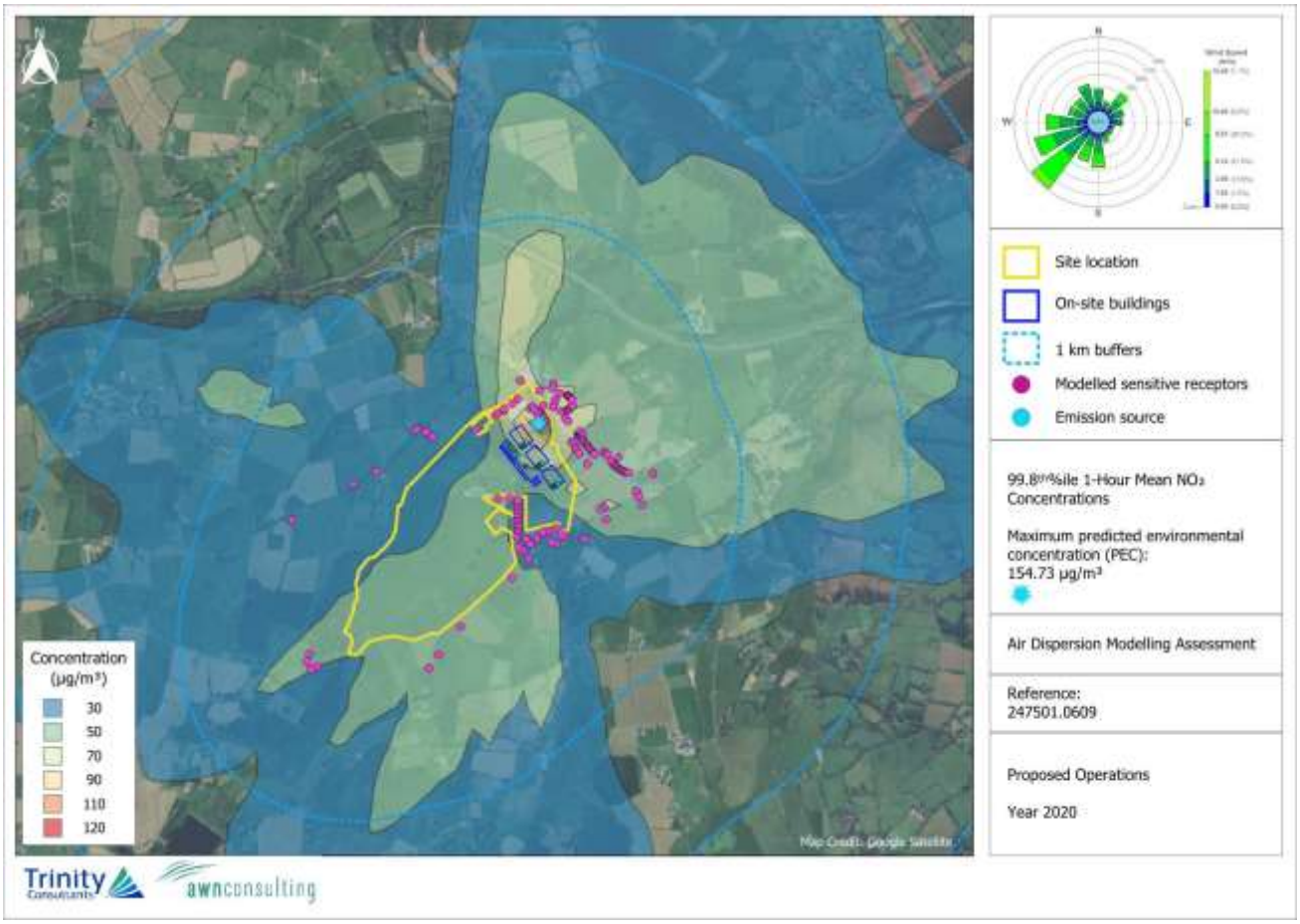
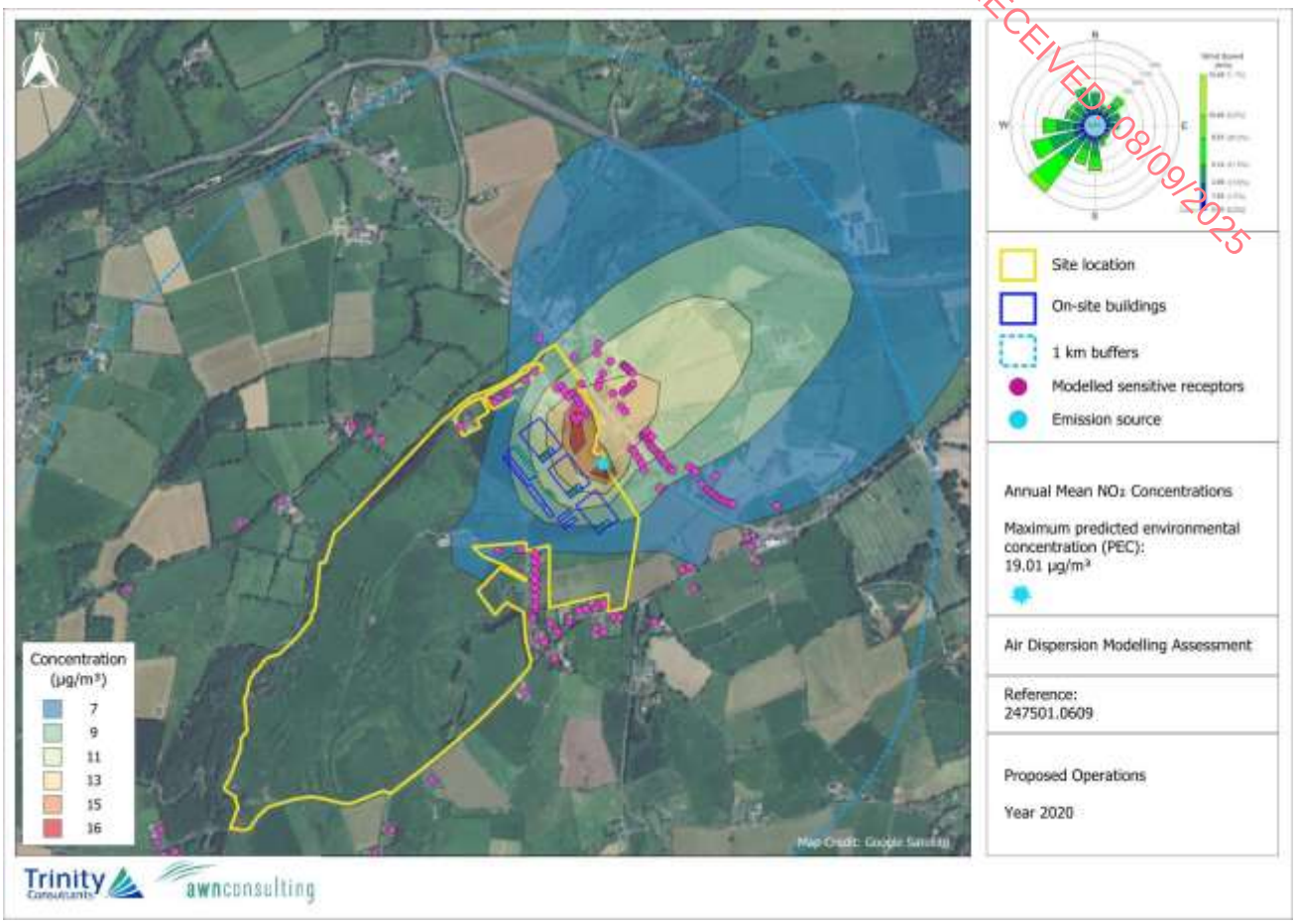


Figure 8.8 Proposed Operations – Annual Mean NO_2 Concentrations (µg/m³)



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Proposed Operations – NO_2 (UKEA Methodology)

Emissions from the 16 no. gas turbines operating continuously as well as emissions from the 60 no. back-up generators in the ICTF were assessed using the UK Environment Agency methodology (UKEA, 2016; 2019).

The methodology, based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value assuming a hypergeometric distribution, has been undertaken at the worst-case residential receptor. The cumulative hypergeometric distribution of 19 or more hours per year was computed and the probability of an exceedance determined as outlined in Table 8.23. The results have been compared to the 98th percentile confidence level to indicate if an exceedance is likely at various operational hours for the normal operating of the gas turbines and the emergency operations of the back-up generators.

The results indicate that the proposed development can operate for a maximum of 809 hours in a year without the likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level). This is considered not significant in terms of air quality.

It should be noted that the UK guidance recommends that there should be no running time restrictions placed on standby generators which provide power on site only during an emergency power outage.

Table 8.23 Hypergeometric Statistical Results at Worst-Case Residential Receptor – NO_2

Pollutant / Meteorological Year	Hours of operation (Hours) (98th%ile) Allowed Prior To Exceedance Of Limit Value	UK Guidance – Probability Value = 0.02 (98th%ile) [a]
NO_2 / 2020	1177	0.02
NO_2 / 2021	978	
NO_2 / 2022	1149	
NO_2 / 2023	1149	
NO_2 / 2024	809	

a. Guidance Outlined In UK EA publication "Diesel Generator Short-Term NO_2 Impact Assessment" (UKEA, 2019)

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8.5.3.2.2 Ecological Receptors

NOx

The NO_X modelling results for ecological receptors under the Proposed Operations scenario are detailed in Table 8.24.

As per Section 8.2.2.2, process contributions (PCs) of NO_X at Natura 2000 sites were compared to the relevant critical level (identified in Section 8.2.2.2.1), and shown in Table 8.24.

The PC for the Lower River Suir SAC (site code 002137) is greater than 1% of the critical level of 30 µg/m^3 for NO_X, therefore this site was considered for further assessment as per Section 8.2.2.2.3 and Figure 8.1. When a background concentration is added to the modelled PC the predicted environmental concentration (PEC) of NO_X in the Lower River Suir SAC is 7.4 µg/m^3 which is in compliance with the critical level of 30 µg/m^3, indicating emissions of NO_X from the proposed development will not have a significant effect on the designated site.

There are no PCs greater than 1% of the relevant critical level at any of the other modelled ecological receptors, therefore no further assessment is required. The effect of nitrogen oxide (NO_X) emissions from the proposed development on sensitive ecological receptors is therefore considered to be ***direct, long-term, negative*** and ***not significant***.

Table 8.24 Proposed Operations – NO_X Designated Habitat Dispersion Model Results

Ecological Receptor	NO_X Process Contributions (µg/m^3)					Critical Level (µg/m^3)	Max PC % of Critical Level	Considered for further assessment?	APIS Background NO_X (µg/m^3)	NO_X PEC (µg/m^3) (further assessment)
	2020	2021	2022	2023	2024					
Lower River Suir SAC	2.22	2.63	2.46	2.27	2.57	30	8.8%	Yes	4.7	7.4
Tramore Dunes and Backstrand SAC	0.08	0.09	0.08	0.08	0.09	30	0.3%	No	n/a	n/a
Mid-Waterford Coast SPA	0.12	0.14	0.15	0.12	0.14	30	0.5%	No	n/a	n/a
Tramore Back Strand SPA	0.08	0.09	0.08	0.08	0.08	30	0.3%	No	n/a	n/a
Ballin Lough (Waterford) pNHA	0.11	0.11	0.09	0.11	0.10	30	0.4%	No	n/a	n/a
Ballyvoyle Head To Tramore pNHA	0.12	0.15	0.15	0.12	0.14	30	0.5%	No	n/a	n/a
Belle Lake pNHA	0.06	0.06	0.06	0.06	0.07	30	0.2%	No	n/a	n/a
Carrickavrantry Reservoir pNHA	0.19	0.22	0.23	0.19	0.22	30	0.8%	No	n/a	n/a
Castlecraddock Bog pNHA	0.08	0.06	0.06	0.06	0.07	30	0.3%	No	n/a	n/a
Fennor Bog pNHA	0.10	0.13	0.10	0.09	0.13	30	0.4%	No	n/a	n/a
Fiddown Island pNHA	0.03	0.03	0.05	0.05	0.04	30	0.2%	No	n/a	n/a

Ecological Receptor	NO_x Process Contributions (µg/m³)					Critical Level (µg/m³)	Max PC % of Critical Level	Considered for further assessment?	APIS Background NO_x (µg/m³)	NO_x PEC (µg/m³) (further assessment)
	2020	2021	2022	2023	2024					
Grannyferry pNHA	0.24	0.18	0.21	0.25	0.22	30	0.8%	No	n/a	n/a
Islandtarnsey Fen pNHA	0.15	0.17	0.18	0.14	0.16	30	0.6%	No	n/a	n/a
Kilbarry Bog pNHA	0.15	0.13	0.13	0.14	0.13	30	0.5%	No	n/a	n/a
King's Channel pNHA	0.13	0.12	0.12	0.13	0.11	30	0.4%	No	n/a	n/a
Lissaviron Bog pNHA	0.07	0.05	0.05	0.06	0.06	30	0.2%	No	n/a	n/a
Lough Cullin pNHA	0.19	0.15	0.16	0.20	0.17	30	0.7%	No	n/a	n/a
Lower River Suir (Coolfinn, Portlaw) pNHA	0.08	0.08	0.12	0.12	0.09	30	0.4%	No	n/a	n/a
Portlaw Woods pNHA	0.07	0.08	0.08	0.10	0.10	30	0.3%	No	n/a	n/a
Tibberaghny Marshes pNHA	0.02	0.02	0.04	0.04	0.03	30	0.1%	No	n/a	n/a
Tramore Dunes And Backstrand pNHA	0.08	0.09	0.08	0.08	0.09	30	0.3%	No	n/a	n/a

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Nitrogen Deposition

In order to consider the effects of nitrogen deposition (as N) owing to emissions from the proposed development on ecological receptors, the maximum annual mean NO_2 process contribution concentrations (PC) are converted into the dry deposition fluxes and then nitrogen deposition fluxes (as described in Section 8.2.4.2.6 and shown in Table 8.10).

As per Section 8.2.2.2.3 process contributions (PCs) of nitrogen deposition at Natura 2000 and nationally designated sites were compared to the relevant critical load (identified in Section 8.2.2.2), and shown in Table 8.25.

For the majority of the modelled ecological receptors the PCs are less than 1% of the relevant critical load, therefore no further assessment is required. The effect of nitrogen deposition due to emissions from the proposed development on these sensitive ecological receptors is therefore considered to be direct, long-term, negative and not significant.

In relation to the Lower River Suir SAC (site code 002137) the PC is greater than 1% of the relevant critical load for nitrogen deposition, and therefore the impact of air emissions from the proposed development at this site has been investigated in further detail, as per the approach outlined in IN2 and discussed in Section 8.2.2.2.3.

A nitrogen deposition background concentration for the relevant section of the Lower River Suir SAC in proximity to the proposed development was derived from the 1 km grid squares on the APIS site (APIS, 2025). When this background concentration is added to the PC a total PEC of 7.1 kg/ha/yr is derived (see Table 8.25). This is below the critical load of 7.5 kg/ha/yr for the Lower River Suir SAC. Therefore, the impact to ecology is predicted to be ***direct, long-term, negative*** and ***not significant***.

Table 8.25 Proposed Operations – Nitrogen Deposition

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Ecological Receptor	NO_2 Process Contributions (µg/m³)					Max NO_2 Dry Deposition (µg/m²/s)	Max NO_2 Nitrogen Deposition (kg/ha/year)	Critical Load (kg/ha/yr)	PC % of Critical Load	Considered for further assessment?	APIS Background N Deposition (kg/ha/yr)	Total PEC N Deposition (kg/ha/yr)
	2020	2021	2022	2023	2024							
Lower River Suir SAC	1.84	2.08	1.99	1.85	2.08	0.0031	0.300	7.5	4.0%	Yes	6.8	7.1
Tramore Dunes and Backstrand SAC	0.07	0.08	0.07	0.07	0.08	0.0001	0.011	7.5	0.1%	No	n/a	n/a
Mid-Waterford Coast SPA	0.11	0.13	0.13	0.10	0.12	0.0002	0.019	7.5	0.3%	No	n/a	n/a
Tramore Back Strand SPA	0.07	0.07	0.07	0.07	0.07	0.0001	0.011	7.5	0.1%	No	n/a	n/a
Ballin Lough (Waterford) pNHA	0.10	0.09	0.08	0.10	0.09	0.0001	0.014	n/a	n/a	No	n/a	n/a
Ballyvoyle Head To Tramore pNHA	0.11	0.13	0.13	0.10	0.12	0.0002	0.019	10.0	0.2%	No	n/a	n/a
Belle Lake pNHA	0.05	0.05	0.06	0.05	0.06	0.0001	0.009	15.0	0.1%	No	n/a	n/a
Carrickavrantry Reservoir pNHA	0.17	0.20	0.20	0.17	0.20	0.0003	0.029	12.5	0.2%	No	n/a	n/a
Castlecraddock Bog pNHA	0.07	0.05	0.05	0.05	0.06	0.0001	0.010	12.5	0.1%	No	n/a	n/a
Fennor Bog pNHA	0.09	0.11	0.09	0.08	0.11	0.0002	0.016	12.5	0.1%	No	n/a	n/a
Fiddown Island pNHA	0.03	0.03	0.04	0.04	0.03	0.0001	0.006	7.5	0.1%	No	n/a	n/a
Grannyferry pNHA	0.22	0.16	0.18	0.22	0.19	0.0003	0.032	7.5	0.4%	No	n/a	n/a
Islandtarnsey Fen pNHA	0.13	0.15	0.16	0.13	0.14	0.0002	0.023	12.5	0.2%	No	n/a	n/a
Kilbarry Bog pNHA	0.13	0.12	0.11	0.13	0.11	0.0002	0.019	12.5	0.1%	No	n/a	n/a
King's Channel pNHA	0.11	0.10	0.10	0.11	0.10	0.0002	0.016	7.5	0.2%	No	n/a	n/a
Lissaviron Bog pNHA	0.06	0.05	0.05	0.05	0.05	0.0001	0.009	12.5	0.1%	No	n/a	n/a
Lough Cullin pNHA	0.17	0.13	0.15	0.17	0.15	0.0003	0.025	10.0	0.3%	No	n/a	n/a
Lower River Suir (Coolfinn, Portlaw) pNHA	0.07	0.07	0.10	0.10	0.08	0.0002	0.015	7.5	0.2%	No	n/a	n/a
Portlaw Woods pNHA	0.05	0.07	0.06	0.08	0.07	0.0001	0.011	10.0	0.1%	No	n/a	n/a
Tibberaghny Marshes pNHA	0.02	0.02	0.04	0.04	0.03	0.0001	0.005	7.5	0.1%	No	n/a	n/a
Tramore Dunes And Backstrand pNHA	0.07	0.08	0.07	0.07	0.08	0.0001	0.011	7.5	0.1%	No	n/a	n/a

Acid Deposition

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In order to consider the effects of acid deposition (as N) owing to emissions from the proposed development on ecological habitat sites, the maximum annual mean NO_2 process contribution concentrations (PC) are converted into the dry deposition fluxes and then acid deposition fluxes (as described in Section 8.2.4.2.6).

As per Section 8.2.2.2.3, process contributions (PCs) of acid deposition (as N) at Natura 2000 and nationally designated sites were compared to the relevant critical load (identified in Section 8.2.2.2), and shown in Table 8.26.

For the majority of the modelled ecological receptors the PCs are less than 1% of the relevant critical load, therefore no further assessment is required. The effect of acid deposition due to emissions from the proposed development on these sensitive ecological receptors is therefore considered to be direct, long-term, negative and not significant.

In relation to the Lower River Suir SAC (site code 002137) the PC is greater than 1% of the relevant critical load for acid deposition, and therefore the impact of air emissions from the proposed development at this site has been investigated in further detail, as per the approach outlined in IN2 and discussed in Section 8.2.2.2.3.

An acid deposition background concentration for the relevant section of the Lower River Suir SAC in proximity to the proposed development was derived from the 1 km grid squares on the APIS site (APIS, 2025) and detailed in Table 8.15. When this background concentration is added to the PC a total PEC of 0.521 keq/ha/yr is derived (see Table 8.26). This is below the critical load range (MaxCLminN and MaxCLMaxN) of 0.714 – 6.22 keq/ha/yr for the Lower River Suir SAC.

In addition, a number of nationally designated pNHAs have been considered for further assessment as the PC is greater than 1% - specifically, the sites considered are: Carrickavrantry Reservoir pNHA; Grannyferry pNHA; Islandtarnsey Fen pNHA; and Lough Cullin pNHA (see Table 8.26).

In relation to the Carrickavartry Reservoir pNHA, the Grannyferry pNHA and the Islandtarnsey Fen pNHA when a background acid deposition level as per Table 8.15 is added to the PCs for these sites, the total PEC is within the critical load range (MaxCLminN and MaxCLMaxN) of 0.286 – 5.052 keq/ha/yr (see Table 8.26).

Regarding the Lough Cullin pNHA, when a background acid deposition level as per Table 8.15 is added to the PCs for these sites, the total PEC is within the critical load range of 0.286 – 1.829 keq/ha/yr (see Table 8.26).

The project ecologist was consulted with regard to the above mentioned pNHAs considered for assessment and in order to determine whether the predicted concentrations are significant in relation to the sensitive habitats at these sites. The project ecologist has reviewed the results and determined that as the concentrations are within the critical load ranges for acid deposition for the Carrickavrantry Reservoir pNHA; Grannyferry pNHA; Islandtarnsey Fen pNHA; and Lough Cullin pNHA then the impact is not significant. Additionally, within the *Screening Acidity Critical Loads* approach taken by APIS (available as a tab in the APIS app) for designated sites, APIS does not consider the critical load function to be exceeded unless the PEC is larger than the maximum critical load.

Therefore, it can be concluded that the impact to sensitive ecology is ***direct, long-term, negative*** and ***not significant***.

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Table 8.26 Proposed Operations – Acid Deposition

Ecological Receptor	NO_2 Process Contributions (µg/m³)					Max NO_2 Dry Deposition (µg/m²/s)	Max NO_2 Acid Deposition (kg/ha/year)	Critical load (MinCLminN) for PC (keq/ha/yr)	PC % of critical load	Considered for further assessment?	APIS Background Acid Deposition (keq/ha/yr)	Total PEC Acid Deposition (N) (keq/ha/yr) (further assessment)	Critical load (MaxCLminN) for PEC (keq/ha/yr)	Critical load (MaxCLminN) for PEC (keq/ha/yr)
	2020	2021	2022	2023	2024									
Lower River Suir SAC	1.84	2.08	1.99	1.85	2.08	0.0031	0.0214	0.143	15.0%	Yes	0.5	0.521	0.714	6.22
Tramore Dunes and Backstrand SAC	0.07	0.08	0.07	0.07	0.08	0.0001	0.0008	0.143	0.5%	No	n/a	n/a	0.714	5.526
Mid-Waterford Coast SPA	0.11	0.13	0.13	0.10	0.12	0.0002	0.0014	0.143	0.96%	No	n/a	n/a	0.286	5.333
Tramore Back Strand SPA	0.07	0.07	0.07	0.07	0.07	0.0001	0.0008	0.143	0.5%	No	n/a	n/a	0.714	5.526
Ballin Lough (Waterford) pNHA	0.10	0.09	0.08	0.10	0.09	0.0001	0.0010	0.143	0.7%	No	n/a	n/a	0.143	5.052
Ballyvoyle Head To Tramore pNHA	0.11	0.13	0.13	0.10	0.12	0.0002	0.0014	0.143	0.9%	No	n/a	n/a	0.286	5.333
Belle Lake pNHA	0.05	0.05	0.06	0.05	0.06	0.0001	0.0006	0.143	0.4%	No	n/a	n/a	0.714	5.634
Carrickavrantry Reservoir pNHA	0.17	0.20	0.20	0.17	0.20	0.0003	0.0021	0.143	1.5%	Yes	0.6	0.582	0.286	5.052
Castlecraddock Bog pNHA	0.07	0.05	0.05	0.05	0.06	0.0001	0.0007	0.143	0.5%	No	n/a	n/a	0.143	5.052
Fennor Bog pNHA	0.09	0.11	0.09	0.08	0.11	0.0002	0.0011	0.143	0.8%	No	n/a	n/a	0.143	5.052
Fiddown Island pNHA	0.03	0.03	0.04	0.04	0.03	0.0001	0.0005	0.143	0.3%	No	n/a	n/a	0.714	6.22
Grannyferry pNHA	0.22	0.16	0.18	0.22	0.19	0.0003	0.0023	0.143	1.6%	Yes	0.4	0.442	0.286	5.052
Islandtarnsey Fen pNHA	0.13	0.15	0.16	0.13	0.14	0.0002	0.0016	0.143	1.1%	Yes	0.8	0.772	0.286	5.052
Kilbarry Bog pNHA	0.13	0.12	0.11	0.13	0.11	0.0002	0.0013	0.143	0.9%	No	n/a	n/a	0.143	5.052
King's Channel pNHA	0.11	0.10	0.10	0.11	0.10	0.0002	0.0012	0.143	0.8%	No	n/a	n/a	0.714	6.22
Lissaviron Bog pNHA	0.06	0.05	0.05	0.05	0.05	0.0001	0.0006	0.143	0.4%	No	n/a	n/a	0.143	5.052
Lough Cullin pNHA	0.17	0.13	0.15	0.17	0.15	0.0003	0.0018	0.143	1.3%	Yes	0.5	0.532	0.286	1.829
Lower River Suir (Coolfinn, Portlaw) pNHA	0.07	0.07	0.10	0.10	0.08	0.0002	0.0010	0.143	0.7%	No	n/a	n/a	0.714	6.22
Portlaw Woods pNHA	0.05	0.07	0.06	0.08	0.07	0.0001	0.0008	0.143	0.5%	No	n/a	n/a	0.714	6.22

Ecological Receptor	NO_2 Process Contributions ($\mu g/m^3$)					Max NO_2 Dry Deposition ($\mu g/m^2/s$)	Max NO_2 Acid Deposition (kg/ha/year)	Critical load (MinCLminN) for PC (keq/ha/yr)	PC % of critical load	Considered for further assessment?	APIS Background Acid Deposition (keq/ha/yr)	Total PEC Acid Deposition (N) (keq/ha/yr) (further assessment)	Critical load (MaxCLminN) for PEC (keq/ha/yr)	Critical load (MaxCLminN) for PEC (keq/ha/yr)
	2020	2021	2022	2023	2024									
Tibberaghny Marshes pNHA	0.02	0.02	0.04	0.04	0.03	0.0001	0.0004	0.143	0.3%	No	n/a	n/a	0.714	6.22
Tramore Dunes And Backstrand pNHA	0.07	0.08	0.07	0.07	0.08	0.0001	0.0008	0.143	0.5%	No	n/a	n/a	0.714	5.526

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8.5.3.3 Operational Phase Indirect Air Quality Impacts from Renewable Electricity Production

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The generation of electricity due to the installation of the solar energy park will lead to indirect net savings in terms of NO_X emissions. The solar park will have an export capacity of approximately 29 MW and an assumed capacity factor of 13.3%, therefore the power generation from the development is expected to be approximately 34 GWh per annum.

The supply of 34 GWh of renewable electricity to the national grid will lead to a net saving in terms of NO_X emissions which may have been emitted from fossil fuels to produce electricity. Results, outlined in Table 8.27, indicate that the impact of the solar park on Ireland's obligations under the National Emissions Reduction Directive are positive. The annual impact of the development is to decrease annual NO_X emission levels by 0.03% of the 2030 ceiling of 40.6kt (relative to the NO_X emissions associated with power generation in Ireland 2021 (EPA, 2023)). The total annual NO_X emissions savings is equivalent to 0.2% of the total NO_X emissions from power generation in 2021. This is considered an indirect, long-term, slight, positive and not significant effect on air quality.

Table 8.27 Predicted Impact of Proposed Solar Park on Ireland's National Emissions Ceiling Obligations

NO_X Emissions Saved Due To Solar Park (tonnes/annum)	Comparison Scenario	NO_X (tonnes/annum)	Annual NO_X Saving (%)
14	National Emission Ceiling 2020 – 2029 [a]	40,600	0.03%
	NO_X Emissions From Power Generation in 2021[b]	8,543	0.2%

a. National Emission Ceiling (EU Directive 2016/2284)
b. For NO_X emissions associated with power generation in Ireland (taken from EPA (2023) *Ireland's Air Pollutant Emissions 1990 – 2030*)

8.6 Mitigation Measures

8.6.1 Construction Phase

The proposed development has been assessed as having a high risk of dust soiling impacts and a low risk of dust related human health impacts during the construction phase as a result of demolition, earthworks, construction and trackout activities (see Section 8.5.2.1).

Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a high risk of dust impacts and aim to minimise impacts at nearby sensitive receptors.

The mitigation measures draw on best practice guidance from Ireland, *Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition* (DCC, 2018), the UK, *Guidance on the Assessment of Dust from Demolition and Construction Version 2.2* (IAQM, 2024), *Controlling Particles, Vapours & Noise Pollution from Construction Sites* (BRE, 2003), *Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings* (The Scottish Office, 1996), *Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance* (ODPM, 2002)) and the USA, *Fugitive Dust Technical Information Document for the Best Available Control Measures* (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.

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Site Management

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions.
- A complaints register will be kept on site detailing any telephone calls or letters of complaint received in connection with dust or air quality concerns, together with details of any remedial actions carried out. The complaints log will be made available to the local authority if requested.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

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Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- Prior to demolition blocks will be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression will be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays should be employed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This will include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. Carry out regular site inspections to monitor compliance with the CEMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

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8.6.2 Operational Phase

The 60 no. back-up generators associated with the ICT facilities will have a NO_X reduction system in place, selective catalytic reduction (SCR) or similar system, to ensure NO_X emissions are minimised to within the concentrations specified in Table 8.11. This is to ensure emissions from the proposed development are in compliance with the ambient air quality standards set out in Table 8.1.

8.7 Monitoring or Reinstatement Measures

8.7.1 Construction Phase

During working hours, dust control methods will be monitored as appropriate depending on the prevailing meteorological conditions as outlined in Section 8.3.1.

Monitoring of construction dust deposition at nearby sensitive receptors during the construction phase of the proposed development will be carried out to ensure mitigation measures are working satisfactorily. This will be done using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff method consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. Dust deposition monitoring will be carried out on a monthly basis (30 days (+/- 2 days)) for the duration of the enabling works and construction period.

An independent contractor will be appointed to carry out this monitoring. The compliance criteria is the TA Luft limit value of 350 mg/m^2/day during the monitoring period. In the event of an exceedance the procedures, site activities and appropriate application of dust mitigation measures will be reviewed and improved to achieve a level below 350 mg/m^2/day in future monitoring.

8.7.2 Operational Phase

The main emission points (gas turbines) in the PGF or 'energy centre' element of the Technology Park in the proposed development will be governed by an Industrial Emissions (IE) licence which will be required to be granted by the EPA prior to operations commencing on site. As part of this IE licence monitoring of the gas turbines will be required. The exact monitoring requirements will be stipulated as a condition within the licence.

8.8 Residual Effects of the Proposed Development

8.8.1 Construction Phase

In order to minimise dust emissions during construction, a series of mitigation measures will be implemented. Once the dust minimisation measures outlined in Section 8.6.1 are implemented, the effect of the proposed development in terms of dust soiling will be ***direct, short-term, negative*** and ***not significant***.

A detailed air quality assessment of the construction stage traffic has been scoped out (as per Section 8.2.3.2) and it can therefore be determined that the construction stage traffic will have a residual ***direct, short-term, neutral*** and ***not significant*** effect on air quality.

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8.8.2 Operational Phase

Dispersion modelling of traffic emissions at sensitive receptors in proximity to impacted road links during the operational phase indicate pollutant emissions will be in compliance with the TII assessment criteria which is based on the impacts in the opening year. Section 8.5.3.1 determined that the impact to air quality as a result of increased traffic volumes during the operational phase of the proposed development will be ***localised, direct, long-term, negative*** and ***not significant*** for the opening year. However, Ireland will need to develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved.

Detailed air dispersion modelling of emissions from the technology park (energy centre and ICT facilities) determined that pollutant concentrations will be in compliance with the relevant limit values set out in Table 8.1. Therefore, emissions from the proposed development will have a ***direct, long-term, negative, slight*** and ***not significant*** impact on air quality, even in a worst-case scenario where the continuous operation of the energy centre is required to support the grid or temporarily power the ICT facilities pending a grid connection.

In addition, there is an indirect, long-term, slight, positive, not significant effect on air quality as a result of renewable energy generation from the proposed 29 MW solar park which has the potential to avoid NO_X emissions from traditional fossil fuel generation.

8.8.3 Risk to Human Health

Dust emissions from the construction phase of the proposed development have the potential to affect human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Section 8.3.3.1, the surrounding area is of low sensitivity to dust related human health impacts. It was determined that there is an overall low risk of dust related human health effects as a result of the construction phase of the proposed development (Table 8.18).

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the residual effect of the construction phase of the proposed development with respect to air quality and human health is ***direct, short-term, negative*** and ***not significant***.

Traffic related air emissions have the potential to affect air quality which can affect human health. As the operational phase assessment has shown that emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health the effects on human health are ***direct, long-term, negative*** and ***not significant***.

Emissions of air pollutants from the proposed technology park during the operational phase are predicted to be in compliance with the ambient air quality standards, which are based on the protection of human health. Therefore, residual effects to human health related to air quality will be ***direct, long-term, negative*** and ***not significant***.

8.9 Cumulative Impacts of the Proposed Development

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8.9.1 Construction Phase

According to the IAQM guidance (IAQM, 2024) should the construction phase of the proposed development coincide with the construction phase of any other development within 500 m then there is the potential for cumulative construction dust impacts. A review of relevant planning applications and projects listed in Chapter 2 Description of Proposed Development of the EIAR within 500 m of the site was conducted in order to identify sites with the potential for cumulative impacts.

If the projects listed in Chapter 2 were to have coinciding construction phases with the proposed development then cumulative dust impacts are likely. There is the potential for these to be significant in the absence of mitigation.

The proposed development has been assessed as having at most a high risk of dust soiling and a low risk of human health impacts during the construction phase. A number of mitigation measures have been proposed in order to ensure significant dust impacts do not occur. Provided the mitigation measures outlined in Section 8.6.1, are implemented throughout the construction phase of the proposed development the impact of the proposed development in combination with any nearby cumulative sites within 500m will not be significant. Impacts are predicted to be direct, short-term, negative and not significant.

8.9.2 Operational Phase

The traffic data supplied for the operational phase assessment included data for cumulative developments within the area. The traffic was reviewed and a detailed air quality assessment of vehicle exhaust emissions was conducted. The effect on air quality during the operational phase of the proposed development, including the cumulative effect, will be direct, long-term, negative and not significant.

The potential for cumulative impact of the emissions from the proposed development with Industrial Emissions (IE) licenced or Integrated Pollution Control (IPC) installations has been considered, in line with the methodology of AG4 (EPA, 2020). The closest IPC or IE licenced facilities are over 6 km from the proposed development. At this distance it is unlikely that the emission plumes from the proposed development and the licenced sites would significantly interact. Therefore, the potential for cumulative impacts is not predicted and a detailed cumulative air dispersion modelling assessment has been scoped out.

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Chapter 9 – Climate

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9. CLIMATE

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9.1 Introduction

This chapter of the EIAR was prepared to assess the likely significant effects on climate as a result of the proposed development at Kilmeaden, Co. Waterford. The proposed development includes a village centre, a technology park – including an energy centre and data centre buildings, as well as a proposed renewable energy solar park.

9.2 Methodology

The climate assessment has been carried out in line with the guidance outlined in the European Commission publications "Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment" (EC, 2013), "Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report" (EC, 2017), Institute of Environmental Management and Assessment (IEMA) "*Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition*" (IEMA, 2022) and the EPA publication "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (EPA, 2022a).

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

The significance criteria for each assessment are described below.

The assessment methodology has been derived with reference to the most appropriate guidance documents relating to climate which are set out in the following sections of this chapter. An overview of the methodology undertaken for the climate impact assessment is outlined below:

- A detailed baseline review of GHG emissions has been undertaken in order to characterise the baseline environment. This has been undertaken through review of available published GHG emission data;
- A review of the most applicable guidelines for the assessment of GHG emissions has been carried out in order to define the significance criteria for the Construction and Operational Phases of the Proposed Development. These guidelines describe appropriate methods for quantifying the emissions of GHGs from the Proposed Development;
- Predictive calculations and impact assessments relating to the likely Operational Phase climatic impacts of the Proposed Development have been undertaken;
- An assessment of the vulnerability of the Proposed Development to climate change has been undertaken; and
- A schedule of mitigation measures has been incorporated where required to reduce, where necessary, the identified potential climatic impacts associated with the Proposed Development.

9.2.1 Relevant Legislation & Guidance

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases

to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

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In order to meet the commitments under the Paris Agreement, the EU enacted Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013 (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading System (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

Following on from the recently published European Climate Law (EU, 2021), and as part of the EU's "Fit for 55" legislative package where the EU has recently committed to a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 levels by 2020, the Effort Sharing Regulation is proposed to be strengthened with increased ambition by the year 2030. The proposal for Ireland is to increase the GHG emission reduction target from 30% to 42% relative to 2005 levels whilst the ETS market will also have more stringent reductions from the currently proposed reduction of 43% by 2030 compared to 2005 to a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual reduction level of 2.2% per year (EU, 2021) with levels in 2022 reducing to 1,285 million tonnes CO_2eq. The EU, in May 2023, published Directive (EU) 2023/959 Amending Directive 2003/87/EC Establishing A System For Greenhouse Gas Emission Allowance Trading Within The Union And Decision (EU) 2015/1814 Concerning The Establishment And Operation Of A Market Stability Reserve For The Union Greenhouse Gas Emission Trading System. As part of this Directive, the cap on emissions has been tightened again to reduce emissions covered by the EU ETS by 62% by 2030 compared to 2005.

The Sharm el-Sheikh Implementation Plan was drafted at COP27 in November 2022. This plan included a new funding arrangement for "loss and damage" for vulnerable countries hit hard by climate disasters. No significant agreements were made regarding the phasing out of fossil fuels or limiting global heating to 1.5°C above pre-industrial levels, however the plan resolves to pursue further efforts to limit the rise to 1.5°C. In order to limit global warming to 1.5 °C rapid, deep and sustained reductions in global greenhouse gas emissions of 43% by 2030 relative to the 2019 level will be required. The latest COP (COP29) meeting took place in Baku in November 2024.

9.2.2 Emission Trading System

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing, heavy industry and facilities which have greater than 20MW thermal input capacity (which is applicable to the Proposed Development). Under the ETS, there are no country-specific targets. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS and thus includes GHG emissions from transport, residential and commercial buildings and agriculture. In contrast to the ETS, Ireland has a country-specific obligation under the Regulation of a 42% reduction in non-ETS GHG emissions by 2030 relative to its 2005 levels.

As outlined in European Commission publication "*Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*" (EC, 2013) the context of global or EU-wide emissions, the GHG emissions associated with the Proposed Development should be assessed in the context of the ETS. The approach that has been adopted at EU level is the EU Climate and Energy Package. In this regard, the EC guidance (EC, 2013) has stated that:

"The EU Emissions Trading System, the backbone of the EU mitigation effort, which sets a cap on emissions from the most polluting sectors including over 11,000 factories, power plants and other installations, including airlines. By 2020, the cap should result in a 21% reduction relative to 2005 levels. The EU ETS covers about 40% of all EU emissions." (EC, 2013).

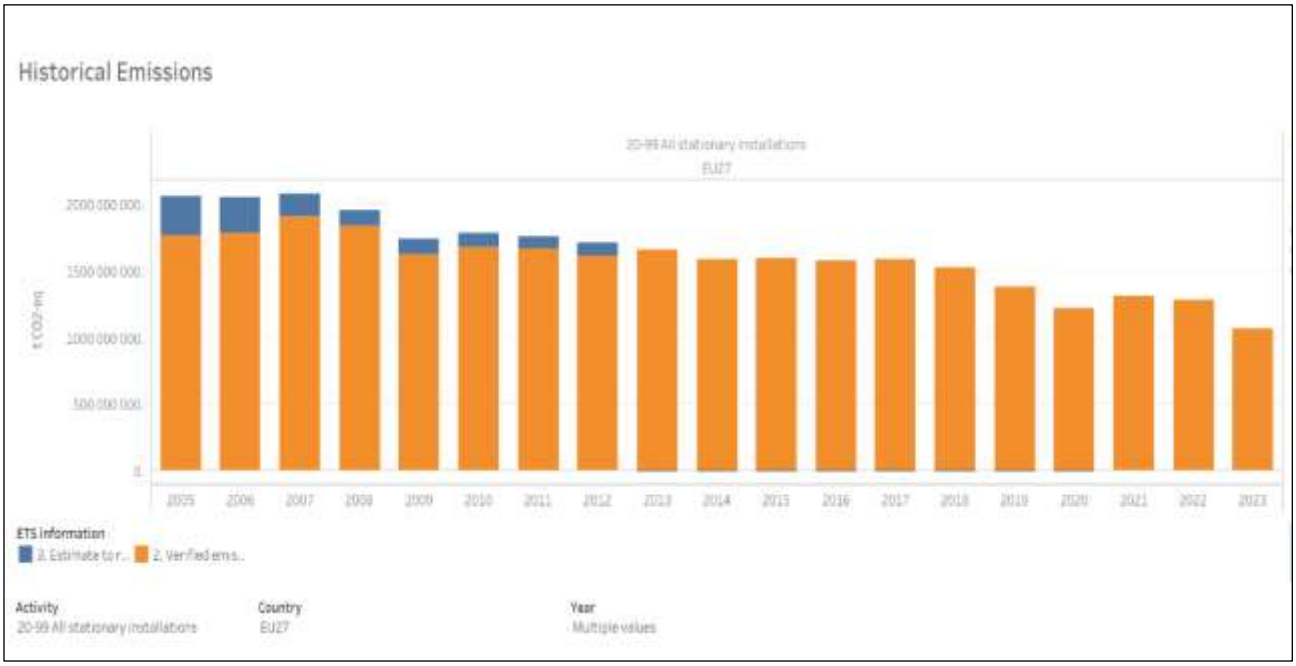
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As outlined in the EU publication "*The EU Emissions Trading System in 2020: trends and projections*" (EU, 2020), the European Union's energy system is decarbonising rapidly. The report states:

"*Total ETS emissions from stationary installations declined by 9.1% between 2018 and 2019, the largest drop in a decade, driven by a strong decrease in coal use for power production*" (EU, 2020)

As shown in Figure 9.1 in the most recent verified emissions from the ETS covering 2005 – 2023 this trend is continuing with the exception of 2021 due to COVID impacts in 2020. On an EU-wide basis, the ETS market in 2023 was approximately 1,064 million tonnes CO_{2eq}.

Figure 9.1 ***Historical ETS Verified Emissions 2005 - 2023***

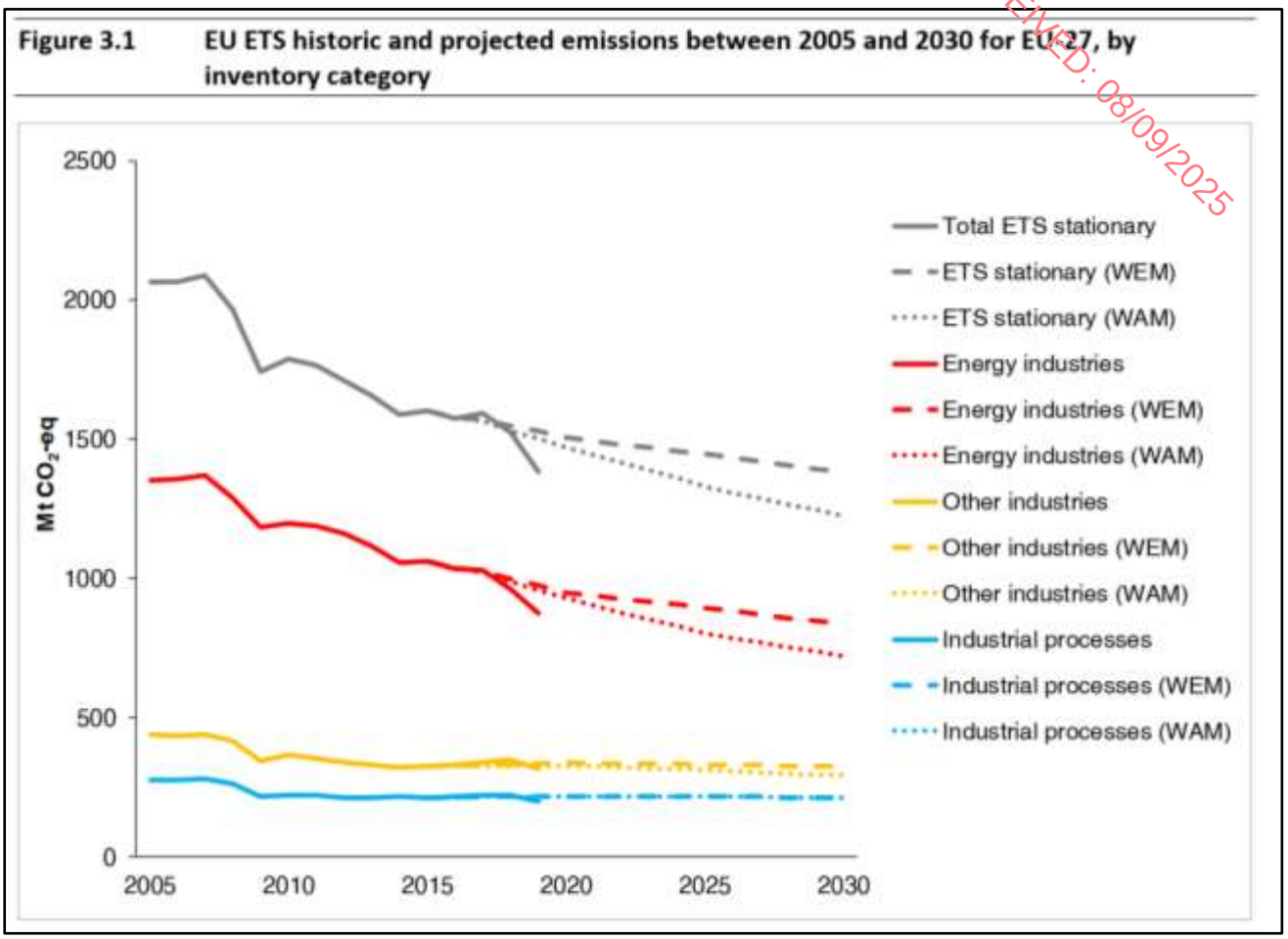


a. Taken from https://www.eea.europa.eu/data-and-maps/dashboards/e missions-trading-viewer-1

The European Topic Centre on Climate report entitled "*Trends and projections in the EU ETS in 2020*" (ETC, 2020) indicates that the reduction in GHG emissions is predicted to continue up to at least 2030 due to current policies in place. As shown in Figure 9.2, both the energy industries and "other industries" are predicted to decrease significantly by 2030.

Figure 9.2 Historical ETS Verified Emissions & Project Emissions 2005 – 2030 (WEM = with existing measures, WAM = with additional measures)

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9.2.3 National Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 Act). The purpose of the 2015 Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the 2015 Act as the 'national transition objective'.

The 2019 *Climate Action Plan* (CAP) (Government of Ireland, 2019), published in June 2019, outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The 2019 CAP set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

In June 2020, the Government published the Programme for Government – Our Shared Future (Government of Ireland, 2020). In relation to climate, there is a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (51% reduction over the decade) with an ultimate aim to achieve net zero emissions by 2050. Policy changes include the acceleration of the electrification of the transport system, including electric bikes, electric vehicles and electric public transport, alongside a ban on new registrations of petrol and diesel cars from 2030. In addition, there is

a policy to ensure an unprecedented modal shift in all areas by a reorientation of investment to walking, cycling and public transport.

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The Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) was published in July 2021. The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'*. The 2021 Climate Act will also '*provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy'*. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority. The 2021 Climate Act has set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defines the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'

The Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) outlines a series of specific actions including:

- To make a strategy to be known as the 'National Long Term Climate Strategy' not less than once in every five-year period with the first to be published for the period 2021 to 2035 and with each subsequent Strategy covering the next three five-year carbon budgets and also include a longer term perspective of at least 30 years;
- To adopt a system of carbon budgets which will be determined as part of a grouping of three five-year periods calculated on an economy-wide basis, starting with the periods 2021 to 2025, 2026 to 2030, and 2031 to 2035;
- To introduce a requirement for Government to adopt "sectoral emission ceilings" for each relevant sector within the limits of each carbon budget;
- To request all local authorities to prepare climate action plans for the purpose of contributing to the national climate objective. These plans should contain mitigation and adaptation measures that the local authority intends to adopt;
- Increasing the power of the Advisory Council to recommend the appropriate climate budget and policies;
- Requiring the Minister to set out a roadmap of actions to include sector specific actions that are required to comply with the carbon budget and sectoral emissions ceiling for the period to which the plan relates; and
- Reporting progress with the CAP on an annual basis with progress including policies, mitigation measures and adaptation measures that have been adopted.

In terms of wider energy policy, as outlined in the EPA publication "*Ireland's Greenhouse Gas Projections 2024-2055*" (EPA, 2025a) under the *With Additional Measures* scenario, emissions from the energy industries sector are projected to decrease by 62% to 3.9 Mt CO_{2eq} over the period 2020 to 2030 including the proposed increase in renewable energy generation to approximately 68% of electricity consumption:

In this scenario it is estimated that renewable energy generation increases to approximately 68% of electricity consumption. This is mainly a result of further expansion in wind energy (comprising 7 GW offshore). Expansion of other renewables (e.g. solar photovoltaics) also occurs under this scenario.

Under the With Additional Measures, Moneypoint power station is assumed to operate in the market up to end 2025 at which point it no longer generates electricity from coal.

In terms of inter-connection, the Greenlink 500MW interconnector to the UK came on stream in April 2025 and the Celtic 700MW interconnector to France is due to come on stream in 2027 (EPA, 2025b).

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The 2025 Climate Action Plan (CAP25) (DECC, 2025) provides a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting us on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. The plan outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. CAP25 also detailed the required governance arrangements for implementation including carbon-proofing of policies and establishment of sectoral emission ceilings and carbon budgets. In relation to data centres, CAP25 provides that emissions from industry sectors covered by the ETS are subject to EU-wide rather than national targets set out under EU Effort Sharing Regulation.

As outlined in CAP25, electricity currently accounts for 12.5% if Ireland's GHG emissions in 2023 which represents a decrease of 26.2% over the period 2018 – 2023. This is due to an increase in renewable electricity generation which stood at 40.7% in 2023. CAP25 also confirms that while annual emissions are reducing for the first carbon budget period, mitigation is insufficient and the projected excess will be circa 1 $MtCO_2eq$ for the period.

As part of the preparation of a 'local authority climate action plan', each local authority shall consult and co-operate with an adjoining local authority in making a local authority climate action plan and co-ordinate the mitigation measures and adaptation measures to be adopted, where appropriate. Each local authority is also required to consider any significant effects the implementation of the local authority climate action plan may have on the adjoining local authority.

Individual county councils in Ireland have also published their own Climate Change Strategies which outline the specific climate objectives for that local authority and associated actions to achieve the objectives. The Waterford CC Climate Action Plan 2024-2029 (WCC, 2024) (the MCC Plan) outlines a number of goals and plans to prepare for and adapt to climate change. The MCC Plan has outlined a target of a 51% reduction in carbon emissions and an energy efficiency improvement of 50% in WCC operations by 2030, creating a pathway to net zero by 2050.

The carbon budget programme was published in November 2021 and comprises three successive 5-year carbon budgets. In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act 2021 states 'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'. The carbon budget is to be produced for 3 sequential budget periods with the third carbon budget in draft format. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. The total emissions allowed under each budget is set out below in Table 9.1, as well as the average annual reduction for each 5-year period.

Table 9.1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025

Period	Mt CO_2eq	Emission Reduction Target
2021-2025	295 Mt CO_2eq	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2eq	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2eq	Reduction in emissions of 3.5% per annum for the third provisional budget.

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CAP25 provides that the economy-wide carbon budgets will be supplemented by sectoral emissions ceilings, setting the maximum amount of GHG emissions that are permitted in a given sector of the economy during each five-year carbon budget. The recently agreed Sectoral Emission Ceilings for each Sector are shown in Table 9.2. It should be noted that 5.25 $MtCO_{2eq}$ of annual emissions reductions are currently unallocated on an economy-wide basis for the second carbon budget period (2026-2030). These will be allocated following a mid-term review and identification of additional abatement measures. The electricity sector emitted approximately 10.5 $MtCO_{2eq}$ in 2018 and has a ceiling of 3 $MtCO_{2eq}$ in 2030 which is a 71% reduction over this period.

Table 9.2 Sectoral Emission Ceiling 2030

Sector	Baseline ($MtCO_2eq$)	Carbon Budgets ($MtCO_2eq$)		2030 Emissions ($MtCO_2eq$)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, a new approach aligned with the EU LULCCF Regulation has been adopted.			
Total	**68**				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	**-**	**295**	**200**	**-**	**51**

The 2025 CAP has outlined the path towards the electricity sectoral emission ceiling target of 3 Mtonnes of CO_2eq by 2030. The core measures are:

- Increasing the share of renewable electricity to 80%,
- Indicative Onshore Wind Capacity of up to 9GW,
- Indicative Offshore Wind Capacity of at least 5GW,
- New Flexible Gas Plant of at least 2GW,
- Demand Side Flexibility – 20-30%,
- Indicative Solar PV Capacity of 8GW.

ESB Networks has published "*Networks For Net Zero – Delivering the Electricity Network for Ireland's Clean Electric Future*" (ESB Networks, 2023) which outlines, what is described as "*a glidepath to net zero by 2050*". UCC / MaREI have also separately published the report "*Our Climate Neutral Future – Zero by 50*" (UCC / MaREI, 2021) which details how the energy system can achieve net zero by 2050 by using technologies, concepts and interventions will already exist today. As shown in Figure 9.4, the report predicts that the energy system will be dominated by renewable energy in 2050.

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Although the pathway may vary somewhat depending on future policy decisions, it is possible that net zero electricity (shown in green in Figure 9.3) may be achieved prior to 2050 compared to the conservative assumption that net zero electricity would not be achieved until 2050. Figure 9.3, which is taken from an unlabelled figure in "*Networks For Net Zero – Delivering the Electricity Network for Ireland's Clean Electric Future*" (ESB Networks, 2023), outlines the year-on-year projected GHG emissions associated with electricity (in green) flipping to negative in the year 2035. As outlined in the figure, the ESB state that the profile reflects a diversity of pathways to meet net zero and carbon budgets. The policy decisions that will impact on the decarbonisation of the national grid include policies which affect wind power (both onshore and offshore), solar, hydrogen and other energy sources, all of which will have a direct impact on the trajectory of the road to net zero GHG emissions. This GHG assessment has been undertaken based on a reasonable worst-case assessment in line with IEMA guidance (IEMA, 2022) which allows for the inherent uncertainty. The IEMA guidance states that the assessment approach should be based on the following:

> *"Once the scope and baseline is set, the calculation method can be agreed along with data collection. The methodology should result in a relevant, complete, consistent, transparent and accurate assessment of the reasonable worst case." (IEMA, 2022)*

In relation to uncertainty, the IEMA Guidance (IEMA, 2022) states:

> *"Uncertainty can arise from quality of data, study boundaries and period of assessment, and can never be eliminated from a study. Uncertainty should be considered and if it significantly affects the outcome of the study, additional steps should be taken to reduce it and provide confidence in results. As a reminder, a relevant, complete, consistent, transparent and accurate assessment of the reasonable worst case must be undertaken despite uncertainties."*

This approach, based on IEMA Guidance (IEMA, 2022) which allows for the inherent uncertainty in the assessment is outlined below:

- In order to address the uncertainty in the year of opening, a worst-case approach has assumed that the Proposed Development will open in January 2027 which will overstate the GHG from the national grid compared to assuming a later date.
- In order to address the uncertainty in the phasing of operations, a worst-case approach has assumed that the Proposed Development will immediately operate at full load in each year whereas in reality the ramp-up period will take place over the course of each year.
- In order to address the uncertainty in the operational load, a worst-case approach has assumed that the Proposed Development will operate at 80% load whereas the average annual load is likely to be less than 80%.
- In order to address the uncertainty in the national grid, a worst-case approach has assumed that the national grid will only obtain net zero by 2050.

Figure 9.3 Net Zero Energy System Emissions Reduction Profile (UCC / MaREI) (ESB Networks, 2023)

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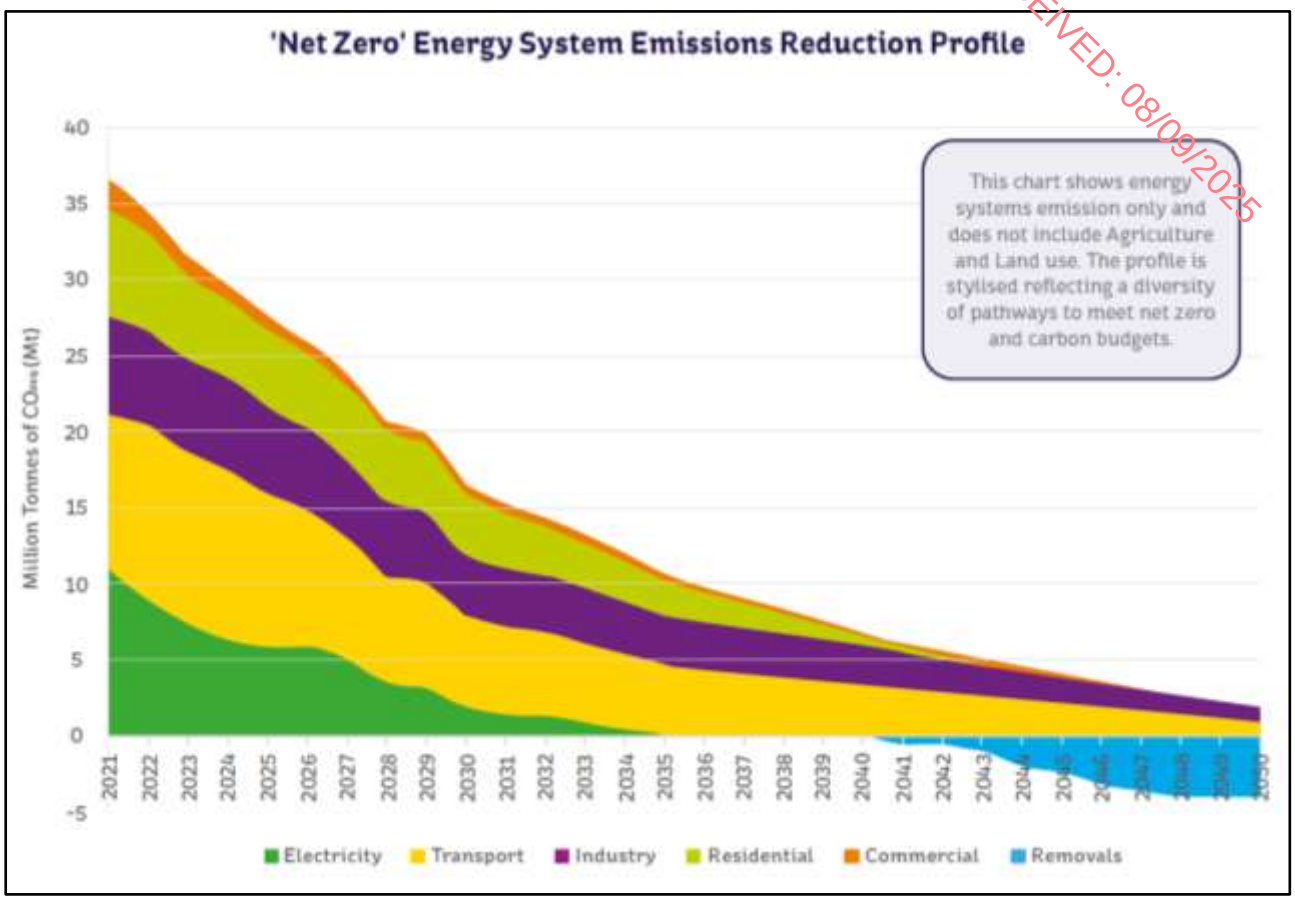
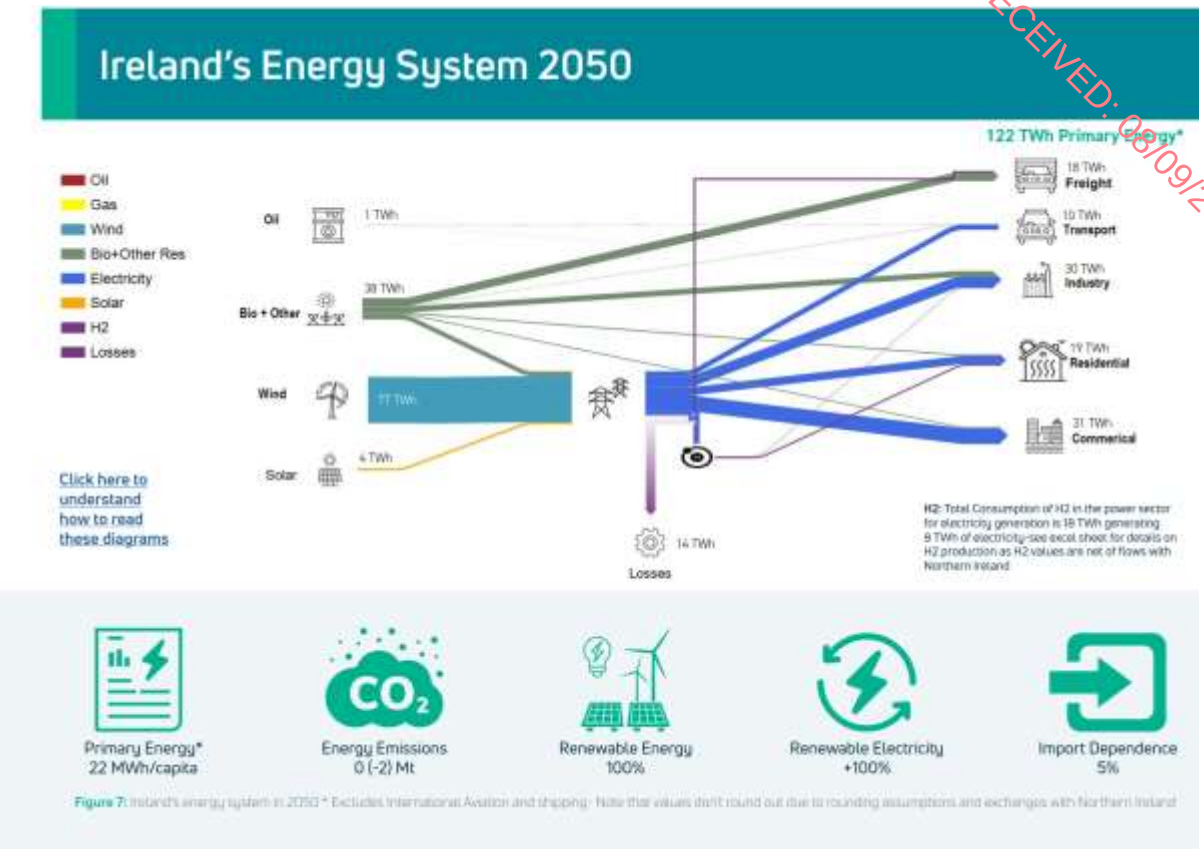


Figure 9.4 Ireland's Energy System 2050 (UCC / MaREI, 2021)

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The GHG emission factor of electricity is based on current reported levels (Year 2024) with the assumption that the GHG emission factor have been assumed to decrease in a linear (straight-line) fashion to reach 119 gCO_2/kWh by 2030 for the purposes of this assessment. Although the assumption of a linear decrease may vary year-on-year, with some years decreasing faster than linear and some years decreasing slower than a linear pattern, it is likely that the 2030 will be similar to that modelled in this assessment as it is in line with the EPA predictions (dated May 2025). This is equivalent to a renewable fraction in the national grid of 68.3% which is the predicted fraction, for the WAM scenario, as outlined in "*Ireland's Greenhouse Gas Emissions Projections - 2024-2055" (EPA, 2025b),* and thereafter linearly reduce to meet net zero by 2050. Table 9.3 is sourced from the predicted carbon intensity value of 226 g CO_2 / kWh in 2024 (EPA, 2025b) and thereafter assuming linear interpolation to 119 g CO_2 / kWh by 2030. The SEAI Interim National Energy Balance 2024 confirms that GHG emissions from electricity reduced by 7.5% compared to 2023 (SEAI, 2025)[1]. The government policy is outlined in the relevant Climate Action Plans including both CAP24 and CAP25 which states a target of 80% renewables by 2030, however, as a worst-case approach a value of 68.3% renewables has been used in the calculations. A renewable rate of 68.3% should be viewed as worst-case as CAP25 (DECC, 2025) and ESB projections are based on an 80% renewable fraction in 2030.

The EPA report "*Ireland's Greenhouse Gas Emissions Projections – 2024 – 2055"* (EPA, 2025a) has predicted that the first carbon budget will be unlikely to be complied with. However, this report is based on data up to the end of 2024.

[1] https://www.seai.ie/news-and-events/news/seai-interim-national-energy-balance-2024

Table 9.3 Projected Electricity GHG Emission Intensity 2026 - 2035 (based on data for 2024 (EPA, 2025b)

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Year	Electricity [Note 1] ($g\ CO_2$ / kWh)
2026	0.190
2027	0.173
2028	0.155
2029	0.137
2030	0.119
2031	0.113
2032	0.107
2033	0.101
2034	0.095
2035	0.089

a. Based on a carbon intensity of 226 g CO2 / kWh in 2024 and assuming linear interpolation to 119 g CO2 / kWh by 2030. The 2030 target is equivalent to reaching 68.3% renewable electricity by 2030 as outlined in EPA (2025). 119 gCO_2/kWh in 2030 has been derived as follows: Year 2024 has a GHG emission rate of 226 gCO_2/kWh based on 39.6% renewables in the national grid. Thus, this equates to a fossil-fuel GHG emission rate of 374 gCO_2/kWh (226 / (1.00-0.396) = 374). With the renewable rate predicted to be 68.3% in 2030, and assuming the same fossil-fuel GHG emission rate of 374 gCO_2/kWh, the overall GHG intensity of the grid in 2030 will be approximately 119 gCO_2/kWh (374 x (1.00-0.683) = 118.5)).

The Long-term Climate Action Strategy was published on the 28th April 2023. In relation to electricity the Government commits to the full decarbonisation of the electricity system by 2050. In relation to the EU ETS, the Long-term Climate Action Strategy states that "A strong price signal, as part of a reformed EU ETS, including progressively more restrictive rules on how many allowances will be available within the EU ETS, is expected to drive decarbonisation over the coming decade by increasing the cost to firms in the EU ETS of doing nothing to reduce their emissions" (DOECC, 2023). The Long-term Climate Action Strategy 2024 (DOECC, 2024), published in August 2024, outlines a range of policies and strategies to address GHG emissions. In relation to electricity the Government commits to the full decarbonisation of the electricity system by 2050 by means of a range of measures including flexibility, grid expansion and increase in renewable power capacity.

The 2025 Climate Action Plan (CAP25) (DECC, 2025) builds on CAP24 with further specific details on the actions required to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. There is more specific focus on the roadmap to align with the legally binding economy-wide carbon budgets and sectoral ceilings compared to previous climate action plans.

CAP25 states that there has been a steady decline in annual emissions from 9.89 $MtCO_2eq$. in 2021 to 7.56 $MtCO_2eq$. in 2023. While the EPA report "*Ireland's Greenhouse Gas Emissions Projections – 2024 – 2055"* (EPA, 2025a) indicates that compliance with the electricity sectoral ceiling is likely in the period 2021 to 2025 it does suggest that an overshoot of over 1.6 $MtCO_2eq$ may occur in the second period 2026 to 2030.

CAP25 in tandem with the *Long-term Strategy on Greenhouse Gas Emissions Reductions* will set the strategic direction for meeting Ireland's climate targets, with CAP25 assisting in delivering the required greenhouse gas emissions abatement to meet the climate targets.

In terms of the unallocated savings gaps first identified in CAP21, CAP25 has set out an approach to deal with these unallocated savings no later than 2025. The approach is focused on exploring emerging

technologies where there is evidence of technical/commercial readiness and the deployment of carbon removal technologies.

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In the Electricity Sector, CAP25 states that corrective actions to accelerate renewable electricity generation and grid flexibility, and manage electricity demand growth, were implemented in 2023. The Future Framework for Offshore Renewable Energy Policy Statement (DECC, 2024) was published in May 2024 and sets out key actions to deliver a potential 20 GW of offshore wind capacity by 2040 and a potential 37GW by 2050.

CAP25 also includes targeted actions to decarbonise industrial heat and support the transition to carbon-neutral manufacturing processes. Public sector leadership is strengthened through a new Buying Greener: Green Public Procurement Strategy and Action Plan (2024–2027) (DECC, 2024), the development of mandatory Climate Action Roadmaps, and enhanced emissions monitoring and reporting across government operations. The government has reinforced the public sector's responsibility to lead by example, particularly through climate-proofing operations and sustainable procurement initiatives. To support innovation and ensure future economic resilience, IDA Ireland continues to attract and support businesses investing in climate technologies and low-carbon solutions.

CAP25 highlights a significant 17% reduction in electricity emissions in early 2024, with wind power supplying nearly 40% of Ireland's total electricity demand and over 100,000 rooftop microgenerators connected to the grid. Investments are ongoing in grid reinforcement, offshore wind development, and interconnectors with France and the UK to enhance renewable generation capacity. According to legal and policy analysts, these developments place Ireland among the top countries globally in per capita wind generation, while continuing to expand domestic and community-based renewable energy. EirGrid, Enterprise Ireland and IDA Ireland have recently signed an MoU to collectively support offshore wind development in Ireland.

CAP25 also reinforces targets first outlined in CAP24 to reduce the embodied carbon of construction materials, with a 10% reduction by 2025 and 30% reduction by 2030 for materials produced and used in Ireland. Cement and high embodied carbon construction materials can be reduced through product substitution, reduced clinker content in cement and uptake of low-carbon construction methods, including those outlined in the Construction Industry Federation 2021 report Modern Methods of Construction (Construction Industry Federation, 2021). There also remains scope for the construction industry to use more timber in construction. In 2022, 24% of new construction in Ireland was built using timber frames to satisfy the demand for housing. Public bodies are now required under the Public Sector Mandate to use best practice project design to reduce embodied carbon; procure concretes with clinker replacements (lower carbon); and require that large construction projects produce a whole life cycle GHG emissions assessment. Further guidance on how the built environment can contribute to a circular, low-carbon economy is detailed in the recently published *A Roadmap for a Resource Efficient Circular Built Environment.*

Furthermore, CAP25 advances sector-specific measures in green procurement, electrification of transport and heat, and just transition (with the introduction of a Just Transition Commission) to support vulnerable communities and ensure equitable decarbonisation. While transport emissions increased by 0.3%, electric vehicles and the expanded use of biofuels are highlighted as the most effective short- to medium-term strategies for emissions reductions in the sector.

In summary, the CAP25 envisages that in tandem with the *Long-term Strategy on Greenhouse Gas Emissions Reductions*, and on the basis that carbon budgets and sectoral emission ceilings will assist with delivering the required greenhouse gas emissions abatement, the 2030 and 2050 climate targets are achievable. The current project is in line with this strategy as the GHG emissions associated with electricity supplied to the project will reduce in line with national policy to obtain net zero by 2050.

9.2.4 Climate Criteria For The Rating Of Impacts

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9.2.4.1.1 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022) outlines a recommended approach for determining the significance of both the construction and operational phases of a development. The approach is based on comparing the 'Do Something' scenario and the net project GHG emissions (i.e. Do Something – Do Minimum) to the relevant carbon budgets (Department of the Taoiseach, 2022). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the Net CO_2 project GHG emissions from the Proposed Development. The Electricity sector emitted approximately 10.5 $MtCO_{2eq}$ in 2018 and has a ceiling of 3 $MtCO_{2eq}$ in 2030 which is a 72% reduction over this period (see Table 9.2).

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022) is based on IEMA guidance (IEMA, 2022) which is broadly consistent with the terminology contained within Figure 3.4 of the EPA's (2022) '*Guidelines on the information to be contained in Environmental Impact Assessment Reports*'.

The Institute of Environmental Management and Assessment (IEMA) guidance note on "*Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition*" (IEMA, 2022) states that:

"the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".

Mitigation has taken a leading role within the Guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings.

The assessment aims to quantify the difference in GHG emissions between the proposed project and the baseline scenario (the alternative project/solution in place of the proposed project). This is done by calculating the difference in whole life net GHG emissions between the two options. The IEMA EIA guidance (IEMA, 2022) does not recommend a particular approach for this due to variations of situations but instead it sets out advice for the key common components necessary for undertaking a GHG emissions assessment. During the assessment IEMA recommend use of a reasonable worst-case scenario rather than an absolute worst-case scenario. The IEMA Guidance (IEMA, 2022) states that a GHG emissions assessment should incorporate the following steps into any climate assessment:

1. Set the scope and boundaries of the GHG assessment;
2. Develop the baseline;
3. Decide upon the emissions calculation methodologies;
4. Data collection;
5. Calculate/determine the GHG emissions inventory; and
6. Consider mitigation opportunities and repeat steps 4 & 5.

Activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions, and where all such exclusions should be clearly stated and total a maximum of 5% of total emissions.

When considering the cumulative assessment, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other. The following section details the specific appraisal methods utilised in order to complete the assessment in accordance with the IEMA Guidance (IEMA, 2022).

9.2.5 Construction Phase Methodology

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The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the Proposed Development.

9.2.6 Operational Phase Methodology

9.2.6.1 Greenhouse Gas Assessment (GHGA)

The data centre (Information Communication Technology (ICT) facility) will operate using electricity from the national grid. The proposed development includes a solar farm with a targeted capacity of 29MW. Roof mounted solar PV is also proposed to be deployed on the ICT building roofs, warehouse building roofs and where required in the village centre. This will achieve a total capacity of 29.689MW on the proposed site which equates to 25% of the current renewable energy generation in Waterford, or 9% of the targeted 2030 total renewable energy generation from solar energy in Waterford. The predicted annual yield for each buildings PV array at approx. 14,470 kWh / annum with a total across all three ICTs of 43.4 MWh / annum. The proposed development will also be co-located with an onsite power generation facility which includes a number of open-cycle gas turbines (OCGTs) with an efficiency of around 33%. The OCGT power generation facility will be developed within the site to primarily operate as a grid supporting asset with the ability to fulfil the CRU requirements to support the ICT facilities by providing onsite dispatchable generation, providing flexibility in demand from the proposed ICT facilities. The proposed OCGT shall incorporate dual fuel gas turbines which operate on renewable HVO (hydrotreated vegetable oil).

When assessing significance, the *2010 IEMA Principles Series on Climate Change Mitigation & EIA* (IEMA, 2010) defines three overarching principles:

- The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect;
- The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality); and
- GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit; as such any GHG emissions or reductions from a project might be considered to be significant. The environmental limit is the national global GHG emission budget that defines a level of dangerous climate change, and any GHG emission that contributes to exceedance of that budget or threatens efforts to stay within it can be considered as significant.

The 2022 Guidance (IEMA, 2022) document builds on those principles with three points:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended IEMA (IEMA, 2022) significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

- Major or moderate adverse impact (significant): A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the net zero[2] trajectory by 2050 or sectoral based transition to net zero targets, results in a significant adverse effect. It is down to the consultant completing the assessment to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects. A project's impact can shift from significant adverse to nonsignificant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect. This is particularly true where policy lags behind the necessary levels of GHG emission reductions for a science based 1.5°C compatible trajectory towards net zero.
- Minor adverse impact (not significant): A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not significant. The project may have residual impacts but is doing enough to align with and contribute to the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral[3] (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.
- Negligible Impact (not significant): A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.
- Beneficial Impact (significant): A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

TII (TII, 2022) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

Significance is determined using the criteria outlined in Table 9.4 (derived from Table 6.7 of PE-ENV-01104 (TII 2022)) along with consideration of the following two factors:

The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and the level of mitigation taking place.

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[2] Net Zero: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period." Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

[3] Carbon Neutral: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period irrespective of the time period or magnitude of offsets required."

Table 9.4 GHGA Significance Criteria

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Effects	Significance level Description	Description
Significant adverse	Major adverse	► The project's GHG impacts are not mitigated. ► The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and ► No meaningful absolute contribution to Ireland's trajectory towards net zero[4].
	Moderate adverse	► The project's GHG impacts are partially mitigated. ► The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and ► Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	► The project's GHG impacts are mitigated through 'good practice' measures. ► The project has complied with existing and emerging policy requirements; and ► Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	► The project's GHG impacts are mitigated beyond design standards. ► The project has gone well beyond existing and emerging policy requirements; and ► Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	► The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. ► The project has gone well beyond existing and emerging policy requirements; and ► Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

The impact of the operational phase of the Proposed Development on climate was determined by an assessment of the indirect CO_2 emissions associated with electricity and the direct CO_2 emissions associated with the operation of the backup generators over the period 2027 (first full year of operation) to 2035. The details and results of the assessment are provided in Section 9.7.2.

9.2.6.2 Climate Change Risk Assessment (CCRA)

The operational phase assessment involves determining the vulnerability of the Proposed Development to climate change. This involves an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability. PE-ENV-01104 (TII, 2022) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

► EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021); and

[4] Net Zero: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period." Net zero is achieved where emissions are first reduced in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

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The baseline environment information provided in Section 9.3, future climate change modelling and input from other experts working on the Proposed Development (i.e. hydrologists) should be used in order to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The project asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022) provide the below list of asset categories and climate hazards to be considered. The asset categories will vary for project type and need to be determined on a project-by-project basis.

- **Asset categories** - Pavements; drainage; structures; utilities; landscaping; signs; light posts; buildings; and fences.
- **Climate hazards** - Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High sensitivity:** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium sensitivity:** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2.
- **Low sensitivity:** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type for example: flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High exposure:** It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium exposure:** It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low exposure:** It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the Proposed Development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the Proposed Development to various climate hazards.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 9.5 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. The impact from climate change on the proposed development can therefore considered to be not significant.

Where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

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Table 9.5 Vulnerability Matrix

		Exposure		
		High (3)	**Medium (2)**	**Low (1)**
Sensitivity	**High (3)**	9 - High	6 – High	3 - Medium
	Medium (2)	6 - High	4 - Medium	2 - Low
	Low (1)	3 - Medium	2 – Low	1 - Low

The screening CCRA, detailed in Section 9.5.5, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 9.6.1.

9.2.7 Forecasting Methods and Difficulties Encountered

There were no difficulties encountered when completing this assessment.

9.3 Receiving Environment

Climate is defined by the IPCC (IPCC, 2023) as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in the industrial age human activities, through the release of GHGs, have impacted on the climate (EPA, 2025b). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the increase of the 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

For the purposes of this assessment, the definition outlined in Council Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (hereafter referred to as the Renewable Energy Directive) for GHGs has been used. In Annex V, C. Methodology Point 5 of the Renewable Energy Directive the relevant GHGs are defined as CO_2, CH_4 and N_2O. CO_2 accounted for 63.7% of total GHG emissions in Ireland in 2018 while CH_4 and N_2O combined accounted for 34.4%. The main source of CH_4 and N_2O is from the agricultural sector. Perfluorocarbons are not relevant in the context of the Renewable Energy Directive as they are not emitted in significant quantities by energy sources.

GHGs have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. In order to compare different GHGs, emissions are calculated on the basis of their Global Warming Potential (GWPs) over a 100-year period, giving a measure of their relative heating effect in the

atmosphere. The IPCC AR6 Synthesis Report: Climate Change 2021 (IPCC, 2023) sets out the global warming potential for a 100-year time period (GWP100) for CO_2 as the basic unit (GWP = 1) whereas CH_4 has a global warming potential equivalent to 29.8 units of CO_2 (for fossil sources) and N_2O has a GWP100 of 273. These values have been refined since the AR5 report.

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9.3.1 Greenhouse Gas Emissions

TII guidance PE-ENV-01104 (TII, 2022) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline (i.e. Do Minimum scenarios).

Given the circumstances of Ireland's declaration of a climate and biodiversity emergency in May 2019 and the November 2019 European Parliament approval of a resolution declaring a climate and environment emergency in Europe, in conjunction with Ireland's current failure to meet its EU binding targets under the GHG Regulation, changes in GHG emissions either beneficially or adversely are of more significance than previously viewed prior to these declarations. Thus, the baseline climatic environment should be considered a highly sensitive environment for the assessment of impacts.

9.3.1.1 Existing GHG Emissions Baseline

Anthropogenic emissions of greenhouse gases (GHGs) in Ireland included in the European Union's Effort Sharing Regulation (ESR) (EU 2018/842) are outlined in the most recent review by the EPA which details emissions up to 2024 (EPA, 2025b). The greenhouse gas emission inventory for 2024 is the fourth of ten years over which compliance with targets set in the ESR will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading System (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce ESR emissions by 42% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. Ireland's 2024 GHG ESR emissions are 42.42 Mt CO_2eq, this is 3.74 Mt CO_2eq more than the annual limit for 2024 (EPA, 2025b). Agriculture continues to be the largest contributor to overall emissions at 38% of the total. Transport, energy industries and the residential sector are the next largest contributors, at 21.7%, 13.3% and 10.4%, respectively.

National total emissions (including LULUCF) for 2024 are 57.64 Mt CO_2eq (see Table 9.6), thus 2021 to 2024 have used 82.5% of the 295 Mt CO_2eq Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a 10.3% average annual emission reduction in 2025 to stay within budget.

Table 9.6 Trends in National GHG Emissions in 2021 – 2024

Sector [Note 1]	2021 Emissions (Mt CO_2e)	2022 Emissions (Mt CO_2e)	2023 Emissions (Mt CO_2e)	2024 Emissions (Mt CO_2e)	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 used	Annual change 2023 to 2024
Electricity	9.89	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.09	11.76	11.8	11.65	54	85.74%	-1.27%
Buildings (Residential)	6.87	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.44	1.45	1.39	1.49	7	82.43%	7.19%

Industry	7.09	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.94	21.78	20.72	20.41	106	80.05%	-1.50%
Other Note 2	1.86	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	4.63	3.98	3.89	3.89	–	–	0
Total including LULUCF	**64.82**	**62.99**	**58.83**	**57.64**	**295**	**82.81%**	**-2.04%**

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Note 1 Reproduced from latest emissions data on the EPA website July 2025 (EPA, 2025a).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

9.3.1.2 Future GHG Baseline

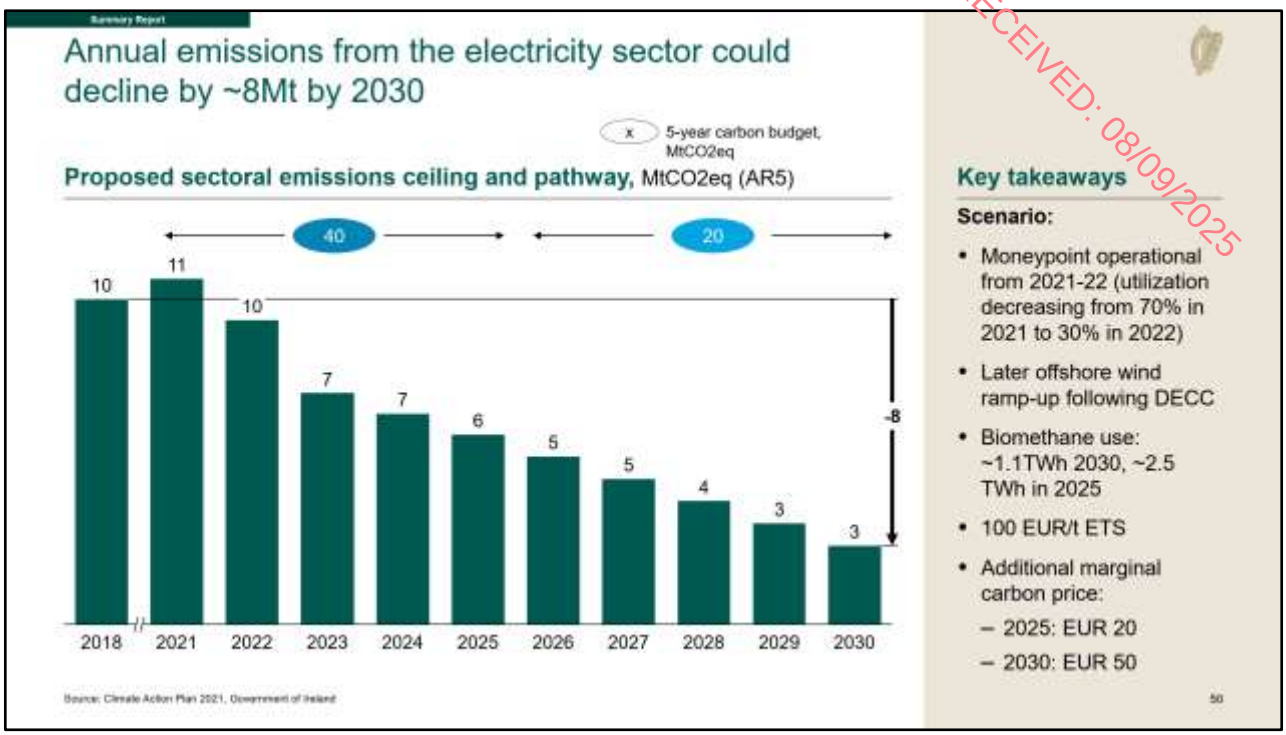
The EPA 2024 GHG Emissions Projections Report for 2024 – 2055 (EPA, 2025b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the latest Government plans (such as CAP24/CAP25) which have a realistic pathway in place for implementation. Implementation of these is classed as a "*With Additional Measures"* scenario for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. However, over the period 2018 to 2030 Ireland is projected to reduce emissions by 22% (and 26% using available flexible mechanisms[5]) which is less than the 42% reduction target under the EU's Effort Sharing Regulations (Regulation (EU) 2018/842) 2030 targets for the "*With Additional Measures*" scenario.

The EPA has reported that the 2024 energy industries GHG emissions have decreased from 7.8 Mtonnes in 2023 to 7.16 Mtonnes in 2024 (EPA, 2025a). Comparing the 2024 reported data to the projected data undertaken for the Sectoral Emission Ceiling in Figure 9.5 indicates that the actual emissions are higher than the target value in 2024. In order to comply with the 2021-2025 target an annual reduction of 15.2% is required in 2025.

[5] Ireland is projected to exceed its National and EU climate targets | Environmental Protection Agency

"These flexibilities are the use of EU Emissions Trading System allowances and credit from action undertaken in the Land use, Land use Change and Forestry (LULUCF) sector. Flexibilities under the Effort Sharing Regulation include the allowance by eligible Member States to achieve their national targets by covering some emissions with EU ETS allowances which would normally have been auctioned. EU-wide, this cannot be more than a combined total of 100 million tonnes CO_2 over the period 2021-2030. The ETS flexibility allows Ireland to transfer emissions of up to 4 per cent of 2005 levels per annum, or 19.1 Mt CO_2eq from the non-ETS to ETS sector, reducing the mitigation requirement in the non-ETS sector while cancelling the corresponding ETS allowances. Also, to stimulate additional action in the land use, land-use change and forestry (LULUCF) sector, Member States can use up to a combined (EU-wide) total of 262 million credits over the entire period 2021-2030 to comply with their national targets. The LULUCF flexibility allows for Ireland to account for greenhouse gas removals of up to 26.8 Mt CO_2eq over two compliance periods 2021-2025 and 2026-2030."

Figure 9.5 Proposed sectoral emissions ceiling and pathway 2018 to 2030 (DECC, 2022)



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The recently published EPA report "Ireland's Greenhouse Gas Emissions Projections - 2024-2055" (EPA, 2025b) states that, based on the WAM scenario, that there will be a 68% reduction in electricity associated GHG emissions between 2018 and 2030 (EPA, 2025b). The report also confirms that over the period 2023 to 2030, electricity under the WEM scenario will reduce from 7.845 to 4.4 Mt CO_2eq whilst under the WAM scenario will reduce from 7.845 to 3.4 Mt CO_2eq. The report states:

"There was a significant drop in emissions from the Energy Industries sector between 2022 and 2023 (down 2.1 Mt CO_2eq or 21.4%). This reduction in emissions was partly due to a 12-fold increase in the amount of imported electricity (9.5% of electricity supply in 2023), in combination with an increase in the share of renewable energy from 38.6% in 2022 to 40.7% in 2023. This step change in interconnector behaviour is projected to increase to 22% in WEM and 19% in WAM by 2030" (EPA, 2025b (Section 4.3))

The EPA Report (EPA, 2025b) also confirms that the electricity sector is likely to achieve the first sectoral emission ceiling target:

"The sectoral ceilings projected to be achieved in the first budget period (2021-25) are in the Electricity, Buildings and 'Other' sectors" (EPA, 2025b (Section 3.2.2))

The future baseline will be determined by whether Ireland meets its targets set out in the CAP25, and future CAPs, alongside binding 2030 EU targets. The future baseline in relation to electricity will be determined by how the national grid decarbonises over the period 2025-2050. Decarbonisation of the national grid will be dependent on policies which affect wind power (both onshore and offshore), solar, hydrogen and other energy sources, all of which will have a direct impact on the trajectory of the road to net zero GHG emissions. Policy decisions and market forces in relation to the import of electricity will also be important on the path to net zero electricity by 2050. Ireland has set a target of 80% renewables by 2030 in CAP25 (DECC, 2025) and net zero GHG emissions by 2050, also outlined in CAP25 (DECC, 2025). However, for the purposes of this assessment a renewable rate of 68.3% has been assumed for 2030.

9.3.1 Vulnerability of the Project to Climate Change

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The Proposed Development study area for assessing a project's vulnerability to climate change should be based on the construction footprint / project boundary. Impacts as a result of climate change involve increases in global temperatures and increases in the number of rainfall days per year. Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east (EPA, 2015). The EPA have compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the Proposed Development:

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

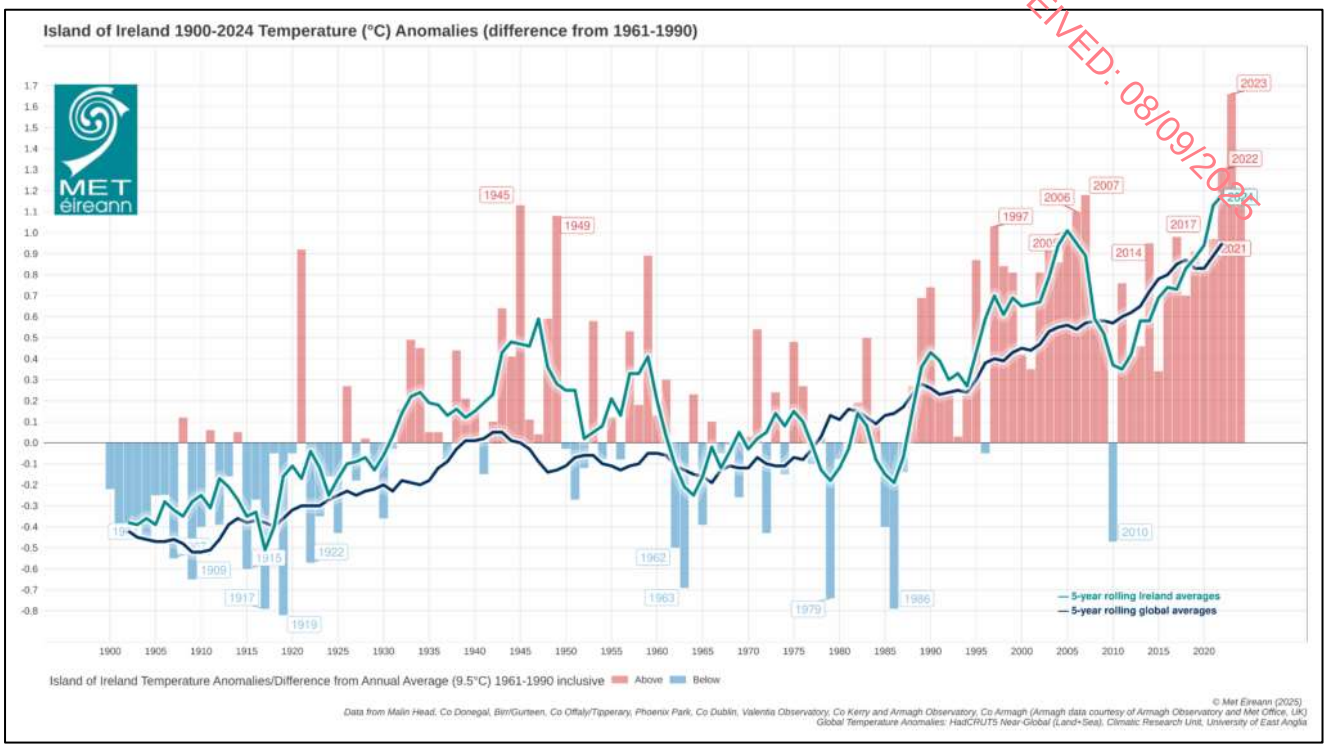
The region of the Proposed Development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Cork Airport is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30-year period from 1991 to 2020. Cork Airport meteorological station is located approximately 95 km south-west of the Proposed Development at the closest point. Meteorological data recorded at Cork Airport over the 30-year period from 1991 to 2020 (see Table 9.6) indicates that the wettest months were December, January and October, and the driest month on average was May. July was the warmest month with a mean temperature of 18.6°C.

The recent weather patterns and extreme weather events recorded by Met Éireann have been reviewed (Met Éireann, 2024a). A noticeable feature of the recent weather has been an increase in the frequency and severity of storms with notable events including Storm Darwin in February 2014, Storm Ellen in August 2020 and Storm Barra in December 2021. The maximum wind gust for Cork Airport for Storm Barra peaked at 119 km/hr with a 10-minute speed of 72 km/hr.

Met Éireann's 2024 Climate Statement (Met Éireann, 2025) states 2024's average shaded air temperature in Ireland is provisionally 10.72°C, which is 1.17°C above the 1961-1990 long-term average. 2023 was the warmest year on record; however, at 0.49°C warmer than 2024 (see Figure 9.6).

Figure 9.6 1900-2024 Temperature (°C) Temperature Anomalies (Differences from 1961-1990)

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The year 2024 had near-average rainfall, with the east of the country experiencing the driest conditions. Sea surface temperatures (SST) were high with 2024 being the fourth warmest year on record.

Recent weather patterns and records of extreme weather events recorded by Met Éireann have been reviewed. Considering the extraordinary 2023 data, Met Éireann states that the latest Irish climate change projections indicate further warming in the future, including warmer winters. The record temperatures means the likelihood of extreme weather events occurring has increased. This will result in longer dry periods and heavy rainfall events. Storm surges and coastal flooding due to sea level rise. Compound events, where coastal surges and extreme rainfall events occur simultaneously will also increase. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

Future climate predictions undertaken by Met Éireann have been published in 'Ireland's Climate: the road ahead (Met Eireann, 2013) based on four scenarios (RCP2.6, RCP4.5, RCP6.0 and RCP8.5) which is named with reference to a range of radiative forcing values for the year 2100 (i.e. 2.6, 4.5, 6.0 and 8.5 W/m^2 (watts per square metre)) respectively with focus on RCP4.5 (medium-low) and RCP8.5 (high) scenarios. In terms of mean temperatures, it is predicted that increases of between 1°C to 3°C will occur under RCP4.5 rising to 2°C to 4°C under RCP8.5. Warm extremes are expected to rise by 2°C to 3°C (RCP4.5) but by up to 5°C under RCP8.5.

The EPA sponsored Report No.159 '*Ensemble of regional climate model projections for Ireland'* (EPA, 2015) which has projected significant decreases in mean annual, spring and summer precipitation amounts with extended dry periods. The decreases are largest for summer, with reductions ranging from 0% to 13% and from 3% to 20% for the medium-to-low and high emission scenarios, respectively. Conversely increases of heavy precipitation of up to 20% are projected to occur during the winter and autumn months. The number of extended dry periods is projected to increase substantially by mid-century during autumn and summer.

In relation to storms, '*Report No.159 – Ensemble of regional climate model projections for Ireland*' (EPA, 2015) indicates that the overall number of North Atlantic cyclones is projected to decrease by 10% coinciding with a decrease in average mean sea-level pressure of 1.5 hectopascals (hPa) for all seasons by mid-century. Wind energy is also predicted to decrease for spring, summer and autumn with a projected increase in winter.

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EPA's *State of the Irish Environment Report (Chapter 2: Climate Change)* (EPA, 2020a) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25 per cent by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The report (EPA, 2020a) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change in order to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions. The report states that mid-century mean annual temperatures in Ireland are projected to increase by between 1.0°C and 1.6°C (subject to the emissions trajectory). In addition, heat events are expected to increase by mid-century (EPA, 2020a). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA ,2020a).

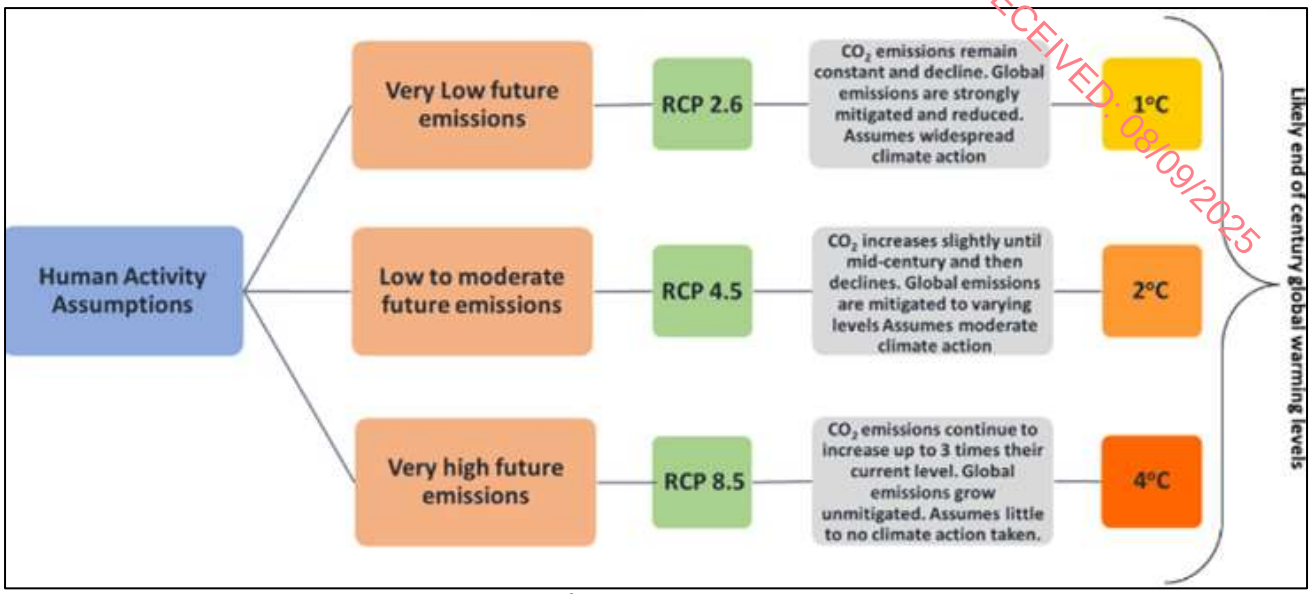
Future climate predictions undertaken by the EPA have been published in '*Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach*' (EPA, 2020b). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060). Mid-century mean annual temperatures are projected to increase by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There will be a substantial decrease of approximately 50% which is projected for the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

Thus, in summary, the recent research into the changing climate as outlined above shows that the facility will need to incorporate into its design the likely future increases in weather variability including increased frequency and intensity of storms and high winds, increased temperatures in summer, the potential for heat waves and flooding from heavy precipitation events.

The research project TRANSLATE (Met Éireann, 2023) has been led by climate researchers from University of Galway – Irish Centre for High End Computing (ICHEC), and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI), supported by Met Éireann climatologists. TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and CMIP5. Representative Concentration Pathways (RCPs) provide a broad range of possible futures based on assumptions of human activity. The modelled scenarios include for "least" (RCP2.6), "more" (RCP4.5) or "most" (RCP8.5) climate change, as shown in Figure 9.7.

Figure 9.7 Representative Concentration Pathways associated emission levels

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a. Source: TRANSLATE project storymap (Met Éireann 2023)

TRANSLATE (Met Éireann, 2023) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (for example, transport, energy, water), by providing information on how Ireland's climate could change as global temperatures increase to 1.5˚C, 2˚C, 2.5˚C, 3˚C or 4˚C. Projections broadly agree with previous projections for Ireland. Ireland climate is dominated by the Atlantic Meridional Overturning Circulation (AMOC), a large system of ocean currents – including the Gulf Stream – characterised by a northward flow of warm water and a southward flow of cold water. Due to the AMOC, Ireland does not suffer from the extremes of temperature experienced by other countries at a similar latitude. Recent studies have projected that the AMOC could decline by 30% - 40% by 2100, resulting in cooler North Atlantic sea surface temperatures (SST) (Met Éireann, 2023). Met Éireann projects that Ireland is nevertheless projected to continue to warm, although the influence of this cool influence may lead to reduced warming compared with continental Europe. AMOC weakening is expected to lead to additional sea level rise around Ireland. With climate change Ireland's temperature and rainfall will undergo more significant changes, for example on average summer temperature could increase by more than 2°C, summer rainfall could decrease by 9% while winter rainfall could increase by 24% as shown in Figure 9.8. Future projects also include a 10-fold increase in the frequency of summer nights (values >15°C) by the end of the century, a decrease in the frequency of cold winter nights and an increase in the number of heatwaves. A heatwave in Ireland is defined as a period of five consecutive days where the daily maximum temperature is greater than 25°C.

Figure 9.8 Change of climate variables for Ireland for different Global warming thresholds

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a. Source: TRANSLATE project storymap (Met Éireann, 2023)

Table 9.7 Cork Airport Historical Meteorological Data 1991-2020

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
mean daily max	8.2	8.5	9.8	12	14.6	17	18.6	18.4	16.5	13.3	10.3	8.7	13
mean daily min	3.2	3.2	3.9	5.3	7.6	10.1	11.7	11.6	10.2	8	5.3	3.8	7
mean temperature	5.7	5.8	6.8	8.6	11.1	13.6	15.2	15	13.4	10.6	7.8	6.2	10
absolute max.	16.1	14.5	18.8	21.1	23.6	27.2	26.7	27.8	24.5	21.1	15.9	13.9	27.8
min. maximum	-0.3	-1.9	-1.3	4.1	8.5	10.5	12.6	13.8	10.2	6	0.6	-3.1	-3.1
max. minimum	10.5	10.6	10.8	11.3	14.4	16.6	17.5	18	17	15.5	13	11.5	18
absolute min.	-5.6	-4.7	-7	-2.4	0.1	4.1	6.2	5.4	3	-1	-3.3	-7.2	-7.2
Relative Humidity (%)													
mean at 0900UTC	91.1	90.5	88.3	83.3	81.3	80.9	83.5	86.1	89.1	90.7	91.4	91.3	87.3
mean at 1500UTC	84.4	79.9	75.8	72.3	71.7	71.5	73.7	73.6	76.3	80.4	83.9	86.5	77.5
Sunshine (hours)													
mean daily duration	2	2.6	3.6	5.4	6.2	6.1	5.3	5.1	4.3	3.2	2.5	1.8	4
greatest daily duration	8.5	10	11.5	13.8	15.5	16	15.3	14.4	12.1	10.3	8.8	7.6	16
mean num. of days with no sun	9.8	6.7	5.7	3.1	2.4	2.3	2.2	2.4	3.4	6.5	7.8	11.4	63.7
Rainfall (mm)													
mean monthly total	131.3	97.2	91.5	86.5	80.8	83.3	87.2	94.6	92	131.2	127	136.6	1239
greatest daily total	39.3	39.0	55.2	37.7	34.9	51.3	73.2	59.0	58.9	52.1	47.9	61.4	73.2
mean num. of days with >= 0.2mm	21.3	18.4	18.3	16.8	15.9	14.6	16.9	16.9	17	19.9	20.8	21.4	218.2
mean num. of days with >= 1.0mm	16.7	13.7	13.4	12.3	12	10.1	11.9	12.2	11.9	15.1	15.6	16.8	161.7
mean num. of days with >= 5.0mm	9.1	6.8	5.7	5.8	5.3	5.6	5.7	5.5	5.8	7.8	7.9	8.7	79.7
Wind (knots)													
mean monthly speed	10.9	11	10.5	9.8	9.4	8.9	8.5	8.5	8.8	9.7	10.2	10.8	9.8
max. gust	71	70	65	63	53	49	47	58	51	74	66	80	80
max. mean 10-minute speed	44	50	42	41	34	33	29	45	35	47	46	56	56

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mean num. of days with gales	1.3	0.8	0.6	0.3	0	0	0	0.1	0.1	0.4	0.6	1	5.1
Weather (mean no. of days with..)													
snow or sleet	2.6	2.5	1.7	0.4	0	0	0	0	0	0	0.3	1.9	9.5
snow lying at 0900UTC	0.3	0.4	0.5	0.1	0	0	0	0	0	0	0	0.4	1.8
hail	1	1.1	1.2	1.5	0.5	0.2	0.1	0	0.1	0.3	0.1	0.4	6.5
thunder	0.3	0.1	0	0.1	0.6	0.4	0.6	0.4	0	0.4	0.1	0.1	3.2
fog	8.6	7.2	8.5	7.8	8	7.3	8.5	9.2	8.3	8.5	7.5	8.5	97.8

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9.4 Characteristics of the Proposed Development

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The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development particularly in areas where potential impacts to climate may occur. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

9.4.1 Construction Phase

The proposed works will comprise construction of a proposed ICT Facility, an OCGT power plant, a solar farm and all associated elements. The key civil engineering works which will have a potential impact on climate during construction are summarised below:

i) During construction, machinery will be used in the site preparation works and during excavation for installation of shallow foundations, drainage services and ancillary infrastructure.

ii) Machinery will be used for the infilling and landscaping.

iii) Temporary storage of construction materials.

iv) Construction traffic accessing the site will emit greenhouse gases during transport.

As outlined in Section 9.6, a construction management plan will be formulated for the construction phase of the project to ensure greenhouse gas emissions are minimised.

9.4.2 Operational Phase

The proposed ICT Facility buildings, once fully operational, will require c. 203 MWe to operate. The ICT facility will be operated using electricity from the national grid.

The key works which will have a potential impact on climate during operation of the Proposed Development are summarised below:

i) Normal Operations Scenario: The ICT facility will operate using electricity from the national grid. The proposed development will also be co-located with an onsite power generation facility, a OCGT with an efficiency of around 33%. The OCGT power generation facility will be developed within the site to primarily operate as a grid supporting asset with the ability to fulfil the CRU requirements to support the ICT facilities by providing onsite dispatchable generation, providing flexibility in demand from the proposed ICT facilities. The proposed OCGT shall incorporate dual fuel gas turbines which will have the ability to operate on renewable HVO.

ii) The proposed development includes a solar farm with a targeted capacity of 29MW. Roof mounted solar PV is also proposed to be deployed on the ICT building roofs, warehouse building roofs and where required in the village centre. This will achieve a total capacity of 29.689MW on the proposed site.

iii) Road traffic accessing the site will emit greenhouse gases. However, the operational phase of the Proposed Development was screened out of the assessment as the traffic will be below the insignificance criteria of 1000 AADT and thus will not contribute a significant volume of additional traffic on the local road network. Therefore, no local greenhouse gas assessment of the traffic impact is required for this development.

9.4.3 Decommissioning Phase

The decommissioning phase of the Proposed Development will comprise decommissioning of all onsite data centres and associated ancillary development.

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9.5 Potential Impacts of the Proposed Development

9.5.1 Do Nothing

In the Do Nothing scenario, greenhouse gas emissions at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

The Do Nothing scenario is found to be ***direct, long-term, neutral*** which is overall ***not significant***.

9.5.2 GHGA for the Construction Phase

Construction traffic would be expected to be the dominant source of greenhouse gas emissions during this phase of the Proposed Development. Construction vehicles and machinery will give rise to CO_2 and N_2O emissions during construction of the Proposed Development. The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) states that site traffic and plant is unlikely to make a significant impact on climate.

It is important to note that the potential impacts associated with the construction phase of the Proposed Development are short-term in nature. When the mitigation measures detailed in the mitigation section (see Section 9.6.1) of this chapter are implemented, GHG emissions from the site will not be significant. Due to the duration and nature of the construction activities, CO_2 and N_2O emissions from construction vehicles and machinery will have a ***short-term*** and ***imperceptibly negative*** impact on climate and thus have a ***not significant*** impact.

9.5.3 Impact of Climate Change on the Construction Phase

Appropriate flood risk measures and extreme weather events have been considered as part of the construction planning. However, the potential for changes to long-term seasonal averages as a result of climate change are not considered to be as significant. Thus, in line with the methodology outlined in Table 9.5, the likelihood of extreme weather and flooding is assessed to be of low sensitivity and with a low exposure leading to a finding of low vulnerability and thus a non-significant impact.

Examples of potential climate impacts are included in Annex D (Climate proofing and environmental impact assessment) of the *Technical Guidance on the Climate Proofing of Infrastructure* (European Commission, 2021a). Potential impacts to the Proposed Development as a result climate change include:

- Flood risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow;
- Geotechnical impacts; and
- Major Storm Damage – including wind damage.

Each of these potential risks are considered with respect to the operational phase of the Proposed Development as detailed in Section 9.5. During the construction phase no assessment is required; however, consideration will be given to the project's vulnerability to climate impacts. During construction, the Contractor will be required to mitigate against the effects of extreme rainfall / flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind / storms, temperature extremes through site risk assessments and method

statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction.

During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

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9.5.4 GHGA for the Operational Phase

The Proposed Development has the potential, in the absence of mitigation, to release significant quantities of GHG emissions during the operational phase of the project. However, as the capacity of the Proposed Development is greater than 20 MW rated thermal input, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading System (ETS) which necessitates offsetting GHG emissions through the purchase of 'carbon credits'. Thus, the Proposed Development will operate under a system where GHG emissions will become increasingly costly and will encourage GHG emission reductions.

In addition, as outlined in the EU Climate Law (EU, 2021) under the Item (13): "*The EU ETS is a cornerstone of the Union's climate policy and constitutes its key tool for reducing greenhouse gas emissions in a cost-effective way.*"

9.5.5 Impact of Climate Change on the Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. Changes in climate will lead to a variety of associates GHG impacts including:

- Increased average temperatures will lead to a greater requirement for cooling of the ICT Facility Buildings leading to greater energy use and associated GHG emissions;
- Increased rainfall will lead to a greater risk of flooding;
- Periods of drought may lead to reduction in water availability.

In order to determine the vulnerability of the Proposed Development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. The following climate hazards have been considered in the context of the Proposed Development: flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning, hail, landslides and fog.

The sensitivity of the Proposed Development to the above climate hazards is assessed irrespective of the project location. Table 9.8 details the sensitivity of the Proposed Development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been established the exposure of the Proposed Development to each of the climate hazards is determined, this is the likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the Proposed Development to each of the climate hazards as per Table 9.5. The results of the vulnerability assessment are detailed in Table 9.8 below.

Table 9.8 Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (coastal, pluvial, fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Drought	1 (Low)	2 (Medium)	2 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)

Fog	1 (Low)	1 (Low)	1 (Low)

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The sensitivity and exposure of the area was determined with reference to a number of online tools and with input from the various discipline specialists on the project team. It was concluded that Proposed Development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low.

9.5.5.1 Flooding

The AtkinsRealis Ireland Ltd Site Specific Flood Risk Assessment completed a Stage 1 flood risk assessment in accordance with the guidelines from which the following conclusions can be drawn:

- There is historic risk of localised flooding on the L4018 which runs through the site however the low point associated with this is so small that it does not show up on sections cut through a detailed topographic survey. It is concluded that there is no significant risk posed from this event.
- There is localised flooding to the north of the site around the Wheelanbridge tributary. It should be noted that the only construction proposed in this area is the construction of earth embankments and that appropriate compensation storage has been provided. It is concluded that there is no significant residual risk from this.
- The majority of the development is within Flood Zone C and the Proposed Development is within Flood Zone C which indicates that flooding is not a risk at the project locations. Additionally, the drainage for the development has been designed with an additional 20% to allow for increased rainfall in future years as a result of climate change.

9.5.5.2 Extreme Wind, Fog, Lightning & Hail

In relation to extreme winds, the appropriate wind loadings are to be calculated in line with the requirements of IS EN 1991-1-4. Lightning protection will be provided for the buildings and designed by a specialist. Hail and fog are not predicted to significantly affect the buildings due to their design.

9.5.5.3 Wildfires

In relation to wildfires, the *Think Hazard!* tool developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) (2023), indicates that the wildfire hazard is classified as medium for the Waterford area. This means that there is between a 10% to 50% chance of experiencing weather that could support a problematic wildfire in the project area that may cause some risk of life and property loss in any given year. Future climate modelling indicates that there could be an increase in the weather conditions which are favourable to fire conditions, these include increases in temperature and prolonged dry periods. However, due to the project location which is adjacent to cultivated land with access to adequate water attenuation the risk of wildfire is significantly lessened and it can be concluded that the Proposed Development is of low vulnerability to wildfires.

9.5.5.4 Landslides

Landslide susceptibility mapping developed by GSI indicates that the Proposed Development location is not within an area that is susceptible to landslides and there are no recorded historical landslide events at the project location. It can be concluded that landslides are not a risk to the Proposed Development site given that it is located outside of areas identified as having a risk of landslides.

9.5.5.5 Extreme Temperatures (Heat & Cold)

At the detailed design stage chosen building materials will be high quality, durable and hard-wearing and chosen to withstand increased variations in temperature in the future as a result of climate change. Snow loads are to be calculated in line with the requirements of IS EN 1991-1-3, which gives guidance to determine the values of loads due to snow to be used for the structural design of buildings and

civil engineering works (below altitudes of 1500 m) and new Met Eireann reports and mapping published in 2022.

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9.5.5.6 Summary

Overall, the Proposed Development has at most low vulnerabilities to the identified climate hazards and therefore no detailed risk assessment is required.

Thus, in line with the methodology outlined in Table 9.5, the likelihood of extreme weather and flooding was assessed to be of low sensitivity and with a low or medium exposure leading to a finding of low vulnerability and thus a ***non-significant*** impact.

Under the 2021 Climate Act, the National Adaptation Framework, which aims to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts, remains in place as does the Carbon Action Plan, which will reduce GHG emissions in future years, with a number of other strategies currently being proposed.

The Electricity & Gas Networks Sector Climate Change Adaptation Plan prepared under the National Adaptation Framework has been prepared by the Department of Communications, Climate Action and Environment (DCCAE, 2019) and considers future climate change impacts on energy infrastructure and aims to reduce vulnerability by building resilience in the energy sector. The plan proposes to avoid or minimise future adverse impacts within the sector and to exploit opportunities. Steps include diversification of energy sources, improved communication between relevant bodies/stakeholders, a requirement for energy network companies to continue to ensure climate change is taken into account in planning and design standards and engineering management practices and identification of vulnerable areas and measures to take with respect to climate impacts.

9.6 Mitigation Measures

9.6.1 Construction Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimized wherever possible during the construction phase. The measures will include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Where possible site traffic will avoid peak traffic periods to avoid congestion on local roads.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Waste materials will be re-used on site where possible and where re-use is not possible on-site they will be sent off-site for recycling, re-use or recovery.
- Sourcing materials locally where possible to reduce transport related CO_2 emissions.

9.6.2 Operational Phase

The data centre will be powered by electricity from the national grid. A brief summary of some of the measures included in the Proposed Development which will help to reduce the impact to climate are:

- Artificial lighting will consist of energy efficient LED luminaires with the use of natural daylight as much as possible through the building design.
- DHW water source heat pump will be used for all spaces.
- The proposed cooling system design accommodates the installation of heat recovery plate heat exchangers to recover waste heat for reuse. The plant proposes to use motorised ventilation with heat recovery efficiency of 66%.

- The cooling solution for the data centre is a hybrid approach that combines fan wall CRAH (Computer Room Air Handler) units with free cooling chillers and direct-to-chip liquid cooling.
- Bicycle parking will be provided to promote more sustainable modes of travel.
- Electric vehicle charging will be provided which promotes more sustainable modes of travel.
- A proposed Battery Energy Storage System (BESS) will provide 114 MWe with an autonomy of 3.5 hours.
- A OCGT power generation facility will be designed to provide 203 MWe (at 10°C) output capacity to match the proposed ICT buildings power demand and operate as a demand and grid supporting asset, providing support to the electricity grid.
- PV solar panels will be installed onsite with over 29MW of input.
- The applicant is aligned with the goals and objectives of the EU Climate Neutral Data Centre Pact and is committed to leading and exceeding the target performance criteria as outlined in the EU Climate Neutral Data Centre Pact.
- The PUE will be annualised to be below 1.287 which is an improvement on the EU Climate Neutral Data Centre Pact.
- The WUE will be annualised to be below 0.000106 which is an improvement on the EU
- Climate Neutral Data Centre Pact target by 99%.

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These above identified measures will aid in reducing the impact to climate during the operational phase of the Proposed Development in line with the goals of the Climate Action Plan.

9.7 Monitoring or Reinstatement Measures

9.7.1 Construction Phase

There is no other proposed monitoring for GHG emissions during the operational phase.

9.7.2 Operational Phase

The main emission points (gas turbines) in the energy centre element of the Technology Park in the proposed development will be governed by an Emission Trading System (ETS) and Industrial Emissions (IE) licence which will be granted by the EPA prior to operations commencing on site. As part of this ETS / IE licence monitoring of the gas turbines will be required. The exact monitoring requirements will be stipulated as a condition within the granted licence.

There is no other proposed monitoring during the operational phase.

9.8 Residual Effects of the Proposed Development

9.8.1 Construction Phase

The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) states that site traffic and plant is unlikely to make a significant impact on climate. Based on the scale and temporary nature of the construction works and the intermittent use of equipment, the potential impact on climate change from the direct impact of the Proposed Development is deemed to be *short-term, minor adverse* and *not significant* in relation to Ireland's obligations under the EU 2030 target.

The effect of the proposed development in terms of climate will be ***direct, short-term, negative*** and ***not significant***.

A detailed climate assessment of the construction stage traffic has been scoped out and it can therefore be determined that the construction stage traffic will have a residual ***direct, short-term, negative*** and ***not significant*** effect on climate.

9.8.2 Impact of Climate Change on the Operational Phase

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Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. A flood risk assessment has been undertaken and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the impact will be ***minor adverse***, which is ***not significant.***

9.8.3 GHG Emissions & Impact of the Operational Phase on Climate Change

The indirect CO_2 emissions from electricity and the direct CO_2 emissions from the backup generators has been assessed below in the context of Ireland's national annual CO_2 emissions. An OCGT power generation facility will also be designed to provide 203 MWe (at 10°C) output capacity to match the proposed ICT buildings power demand and operate as a demand and grid supporting asset, providing support to the electricity grid. There will also be a proposed Battery Energy Storage System (BESS) which will provide 114 MWe with an autonomy of 3.5 hours.

The associated GHG emissions of the Proposed Development will be mainly dictated by the carbon intensity of electricity. The OCGT will in effect form part of the national grid and thus has not been included directly in the calculations to avoid double counting of GHG emissions. The expected GHG emissions from electricity is shown in Table 9.3 based on the carbon intensity of electricity for the relevant year.

The indirect CO_2 emissions from electricity and the direct CO_2 emissions from the backup generators to operate the Proposed Development has been assessed below in the context of Ireland's national annual CO_2 emissions. Thus, for Year 2027, the GHG emissions from electricity will be based on the expected GHG emission rate in 2027 taking into the account the GHG reductions out to 2035.

The emission calculations are based on the 1781 GWh from electricity, based on an average demand of 203 MWe and based on the operation of the backup generators for 72 hours per year. The GHG emissions translate to approximately 314,198 tonnes of CO_2eq based on the likely electricity GHG emission rate in 2027. By 2030, this is likely to decrease to 219,842 CO_2eq as the fraction of renewable gas increases as shown in Table 9.9. It is expected that by 2050, electricity will be carbon neutral in line with Government policy. In terms of GHG emissions relative to the Sectoral Emission Ceiling as outlined in Table 9.2, the facility in 2030 will account for 5.5% of the 2030 electricity ceiling. In relation to the ETS 2030 target, the proposed facility will account for 0.032% of this target in 2030. In relation to data centres, CAP25 provides that emissions from industry sectors, where referring to EU legislation, covered by the ETS are subject to EU-wide rather than national targets set out under EU Effort Sharing Regulation.

Table 9.9 GHG Emissions (CO_{2eq}) For The Proposed Development (Tonnes CO_{2eq})

Year	Electricity GHG Emissions (tonnes CO_2eq)	Back-Up Generator GHG Emissions (tonnes CO_2eq)	Total (tonnes CO_2eq)	% of 2030 Emission Trading System Target	% of 2030 Electricity Sectoral Emission Ceiling
2027	9.966	304,232	314,198	0.045%	7.9%
2028	9.966	272,780	282,746	0.041%	7.1%
2029	9.966	241,328	251,294	0.036%	6.3%
2030	9.966	209,876	219,842	0.032%	5.5%
2031	9.966	199,382	209,348	0.030%	5.2%
2032	9.966	188,888	198,854	0.029%	5.0%
2033	9.966	178,395	188,361	0.027%	4.7%

Year	Electricity GHG Emissions (tonnes CO_2eq)	Back-Up Generator GHG Emissions (tonnes CO_2eq)	Total (tonnes CO_2eq)	% of 2030 Emission Trading System Target	% of 2030 Electricity Sectoral Emission Ceiling
2034	9.966	167,901	177,867	0.026%	4.4%
2035	9.966	157,407	167,373	0.024%	4.2%

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9.8.4 Determination Of The Impact of the Operational Phase on Climate

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors as set out in Section 9.2.4. In relation to climate, as there are no project specific assessment criteria, the Proposed Development has been assessed against the recommended IEMA (IEMA, 2022) significance determination (see Section 9.2.4).

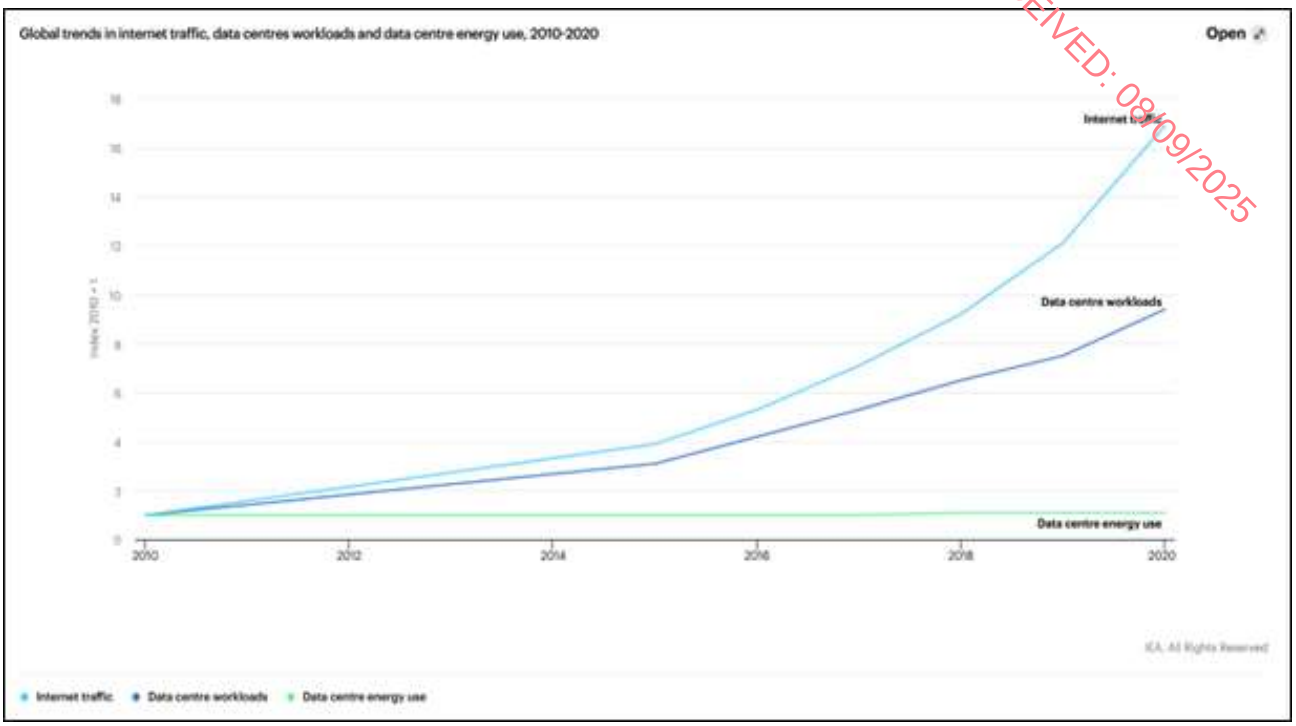
In reference to Principle 1 of IEMA Guidance (IEMA, 2022), the Proposed Development will replace activities which have a higher GHG profile. Data centre facilities represent a significantly more efficient means of data storage when compared to a distributed model of enterprise data storage by individuals and companies (or 'enterprise sites'). Data centres are more energy efficient than enterprise sites due to comprehensive efficiency central to the design of the Proposed Development. In a June 2020 report, the International Energy Agency noted: *"Hyperscale data centres are very efficient large-scale cloud data centres that run at high capacity, owing in part to virtualisation software that enables data centre operators to deliver greater work output with fewer servers. The shift away from small, inefficient data centres towards much larger cloudand hyperscale data centres is evident in the shrinking share of data centre infrastructure in total energy demand..."*[6]. A study published in 2020 by Science[7] Magazine, found that while cloud computing productivity has grown globally by 550% between 2010 and 2018, energy consumption rose in tandem during the same period by just 6%, demonstrating the energy efficiency improvements of the industry, most notably by hyperscale data centres, as per the current project. A report from the international Energy Agency (IEA) entitled "Data Centres & Data Transmission Networks (IEA, 2021) found that while global internet traffic surged by more than 40% in 2020, this strong growth in demandfor data centre services continues to be mostly offset by ongoing efficiency improvements for data centre infrastructure as shown in Figure 9.9.

[6] IEA Data Centres and Data Transmission Networks – June 2020

[7] Masanet, Eric; Shehabi; Arman, Lei; Nuoa, Smith, Sarah; Koomey, Jonathan; "Recalibrating global data center energy-use estimates", Sciencemag.org, February 28, 2020, Vol. 367, Issue 6481; ("Expressed as energy use per compute instance, the energy intensity of global datacenters has decreased by 20% annually since 2010….").

Figure 9.9 Global Trends In Internet Traffic, Data Centres Workloads & Data entre Energy Use,2010 – 2020 (IEA, 2021)

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In the wider context, data centres are approximately 80% more efficient than on-premises servers and the associated GHG savings have not been accounted for in the current analysis[5].

In reference to Principle 2 of IEMA Guidance (IEMA, 2022), a range of measures will be employed which will reduce GHG emissions and are in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022) including the installation of PV panels with a targeted capacity of 29MW. Roof mounted solar PV is also proposed to be deployed on the ICT building roofs, warehouse building roofs and where required in the village centre. This will achieve a total capacity of 20.689MW on the proposed site. In addition, waste heat from the proposed ICT facilities will be recovered and reused in the new village centre via a district heating system.

In reference to Principle 3, it is the intention of the applicant that measures be implemented in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022). The phasing of the development and the period taken to reach full capacity within each planned phase will result in the 'ramping up' of demand associated with the project over a number of years during the lifetime of the permission and thus the GHG emissions in the early years of the project will be an overestimation of reality.

The project will undertake to put in place a Corporate Purchase Power Agreement such that the developer demonstrates that the energy consumed by the development on site is matched by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy thus supporting the development of additional renewable power. This will offset residual GHG emissions associated with the Proposed Development, given that the energy consumed by the development on site would be matched by renewable energy generation.

An OCGT power generation facility will also be designed to provide 203 MWe (at 10°C) output capacity to match the proposed ICT buildings power demand and operate as a demand and grid supporting asset, providing support to the electricity grid. There will also be a proposed Battery Energy Storage System (BESS) which will provide 114 MWe with an autonomy of 3.5 hours.

With a reduction in residual emissions through best practice and the implementation of a series of adaptive design measures, including a solar farm with a targeted capacity of 29MW, the net impact of the Proposed Development is not significant. Given that the use of electricity to power the facility will achieve net zero by 2050 and the intention to meet all interim fossil fuel derived GHG emissions associated with the Proposed Development by the purchase of Corporate Power Purchase Agreements (CPPAs) the predicted impact to climate is deemed to be ***indirect, long-term, negative*** *and* ***minor adverse***. Thus, the impact of the Proposed Development, in line with the IEMA methodology (IEMA, 2022), as shown in Figure 9.10 is reduced to a ***minor adverse, non-significant*** impact.

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Figure 9.10 Diagram of Significance Criteria – GHGs Emissions vs Time To 2050 (IEMA, 2022)

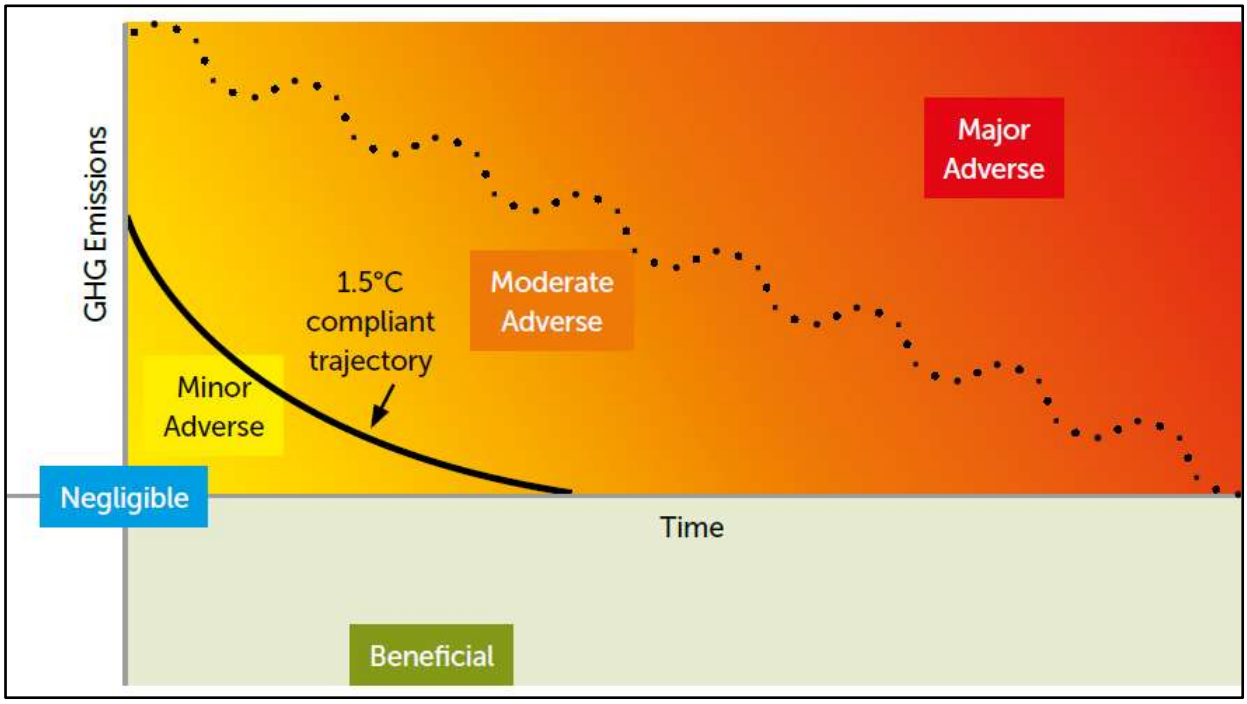


Table 9.10 shows the significance of the project when compared to the 2030 ETS target and the Electricity 2030 Sectoral Emission Ceiling based on the approach set out in IEMA guidance (IEMA, 2022). The assessment is presented both prior to and post mitigation. As shown in Table 9.10, the impact of the project prior to mitigation would be deemed to be a moderately adverse impact. Although the Proposed Development prior to mitigation is better than the "do-nothing" scenario of enterprise data centres, the impact would still be significant in the absence of appropriate mitigation.

Also presented in Table 9.10 is the impact post mitigation. As outlined above the project will use "best practice" design measures and waste heat from the proposed ICT facilities will be recovered and reused in the new village centre via a district heating system. In addition, the facility will seek to enter into CPPAs to offset residual GHG emissions. With the implementation of these measures the impact of the proposed project, in line with the IEMA methodology (IEMA, 2022), will become classified as a ***minor adverse, non-significant*** impact. Minor adverse is equivalent to ***slight*** under the EIAR terminology (EPA, 2022).

Table 9.10 GHG Emissions Associated With The Proposed Development Compared To Sectoral Emission Ceiling & ETS

Scenario	% Of 2030 ETS Total Note 1	% Of Electricity Emission 2030 Ceiling Note 2	Significance (Prior to mitigation)	Significance (After mitigation)
Do Something	0.032%	5.5%	Moderate Adverse	Minor Adverse

Note 1 ETS 2030 Total = 690.91 Million Tonnes CO_{2eq}

Note 2 Based on 2030

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IEMA (2022) states in regards to significance that:

"A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science based emissions trajectory of ongoing but declining emissions towards net zero." (IEMA, 2022)

In addition, IEMA (2022) states that;

"*Where embedded/committed mitigation is relied upon in the assessment of effects, the practitioner must form a clear judgement that this mitigation is:*

1. Evidenced in the design for the project,
2. A committed goal that is secured, e.g. forming part of the description of development, a specific planning condition/requirement, or a legal agreement,
3. *Realistic and achievable to deliver."* (IEMA, 2022)

Thus, the mitigation measures outlined in Section 9.6 to ensure that any residual GHG emissions are mitigated in line with the IEMA guidance.

9.9 Residual Impacts of the Proposed Development

Once the mitigation measures outlined in Section 9.6 are implemented, the residual impacts on climate from the construction of the Proposed Development will be ***short-term*** and ***slight*** and for the operational phase of the Proposed Development will be ***long-term, negative*** and ***slight.*** Thus, in terms of climate, both the construction phase and operational phase will be ***not significant***.

9.10 Cumulative Impacts of the Proposed Development

In relation to climate, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other (IEMA, 2022).

9.11 Compliance With Section 15 Of The Climate Action & Low Carbon Development Act (Amended) 2021

Section 15 of the Climate Action & Low Carbon Development Act (Amended) 2021 states that:

(1) "A relevant body shall, in so far as practicable, perform its functions in a manner consistent with:
(a) the most recent approved climate action plan,
(b) the most recent approved national long-term climate action strategy,
(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

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The Proposed Development is aligned with the above-mentioned plans, strategies and objectives as outlined below.

In relation to 15.1(a), in respect of the most approved climate action plan (CAP25), the development is fully aligned with the CAP25 and all relevant climate policies. In relation to 15.1(a) the 2025 CAP states that in regard to industry (this also applies to electricity generators):

> *"A key target for the industry sector is to reduce emissions …….80% of the sector's emissions fall within EU ETS. This means Ireland's significant industrial emitters comprising of manufacturing companies, primarily in the cement, alumina, food and beverage, pharmaceutical and chemicals sectors are motivated to reduce emissions if they are to remain competitive as the price of EU ETS allowances rise and the volume of free allocations is reduced." (2025 CAP, page 80).*

Thus, the indirect electricity emissions and the direct emissions from backup diesel generators will operate within the ETS and will both require greenhouse gas permits under the ETS in order to operate and thus the GHG emissions associated with the Proposed Development will be in line with Section 13.3.5 of the 2025 CAP which stresses the importance of the EU ETS in reducing industry GHG emissions

The 2025 CAP also stresses the importance of the need for greater renewable energy in the national grid in order to meet the 2030 interim target and the 2050 target, stating that:

> *"Increased deployment of onshore renewable electricity generation is key to achieving the requirements of the recast EU Renewable Energy Directive and the national climate objective." (2025 CAP, Page 123)*

CAP25 has outlined the path towards the electricity target by 2030 of a 75% reduction in GHG emissions compared to 2018. The core measures are:

- Increasing the share of renewable electricity to 80%,
- Indicative Onshore Wind Capacity of up to 9GW,
- Indicative Offshore Wind Capacity of at least 5GW,
- Indicative Solar PV Capacity of 8GW.

In this regard, the applicant has committed to a Corporate Purchase Power Agreement which demonstrates that the energy consumed by the development on site is matched by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy.

In addition, as outlined under Section 13.3.2.9 Emission Trading System, the CAP24[8] states:

> *"The EU ETS is a cornerstone of the EU's policy to combat climate change and it is a key tool for reducing greenhouse gas emissions cost-effectively The EU ETS operates on a "cap and trade" principle. The cap is an absolute limit on the level of emissions across the EU ETS marketplace, and all participants must either reduce their emissions in line with their emission allowance, or purchase permits from another market participant that has excess emission allowances to trade. The EU ETS is an important mechanism to drive emissions reductions in Ireland. Revisions for the EU ETS proposed under the EU Fit for 55 package were formally approved in April 2023 and include significant changes that aim at strengthening the decarbonisation incentive in industry. EU ETS emissions are set to reduce by 62% (previously 43%) compared to 2005, further tightening the*

[8] "*Climate Action Plan 2025 builds upon last year's Plan by refining and updating the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings and it should be read in conjunction with Climate Action Plan 2024*". Climate Action Plan 2025

cap on all participants. In addition, while industrial emitters currently receive a proportion of free allocation of emissions permits, the updated EU ETS will see free allocation for many industries phased out from 2026, adding further upward pressure to the carbon price." (CAP24, page 191).

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Thus, the indirect electricity emissions and the direct emissions from backup generators will both require greenhouse gas permits under the ETS in order to operate and thus the GHG emissions associated with the Proposed Development will be in line with Section 13.3.2.9 of CAP24 which stresses the importance of the EU ETS in reducing industry GHG emissions. Having regard to the foregoing, the proposal is in accordance with the provisions of CAP24 and CAP25.

Based on the information provided in this Chapter and in the application as whole, the foregoing analysis demonstrates that the planning authority can be satisfied that, by granting permission for the Proposed Development, it would, in so far as practicable, be performing its functions in a manner consistent with Section 15.1(a).

In relation to 15.1(a), in respect of the most approved climate action plan (CAP25), the development is fully aligned with the CAP25 and all relevant climate policies.

In relation to 15.1(b), the Long-term Climate Action Strategy was published on the 28th April 2023. In relation to electricity, the Government commits to the full decarbonisation of the electricity system by 2050. In relation to the EU ETS, the Long-term Climate Action Strategy states that "*A strong price signal, as part of a reformed EU ETS, including progressively more restrictive rules on how many allowances will be available within the EU ETS, is expected to drive decarbonisation over the coming decade by increasing the cost to firms in the EU ETS of doing nothing to reduce their emissions"* (DECC, 2023).

The Long-term Climate Action Strategy outlined the importance of (i) completing the actions in the Climate Action Plan, (ii) greater demand side management, (iii) better annual forecasting for the electricity and gas systems and (iv) security of gas supply infrastructure, particularly in the context of electricity generation.

The indicative pathway outlined in the Strategy for electricity includes:

- Build-out of renewable generation capacity, including onshore wind, offshore wind, and solar PV,
- Deployment of zero emissions gas to manage inter-seasonal variability,
- Upgrade of transmission and distribution networks to support significantly increased electricity demand in 2050.

In terms of electricity, the Long-term Climate Action Strategy states:

> *"Ireland will continue its efforts to decarbonise the electricity sector by taking advantage of its significant renewable energy resources in a way that is competitive, cost-effective and ensures the security of our electricity supply. By doing this, we will also decrease our dependence on imported fossil fuels. As Ireland decarbonises its energy system, demand for electricity will increase and total demand for natural gas will decrease. Ireland must ensure that its decarbonisation efforts are underpinned by security, and affordability, in how we access and use our energy resources" (DECC, 2023).*

In relation to the EU ETS, the Long-term Climate Action Strategy states that:

> *"A strong price signal, as part of a reformed EU ETS, including progressively more restrictive rules on how many allowances will be available within the EU ETS, is expected to drive decarbonisation over the coming decade by increasing the cost to firms in the EU ETS of doing nothing to reduce their emissions" (DECC, 2023).*

In relation to data centres, the Long-term Climate Action Strategy states that:

> *"Energy demand, including data centres, will be expected to operate within Sectoral Emission Ceilings and further signals will be required to locate demand where existing or future electricity grid is available and close to renewable energy generation. Research and development in energy storage and flexibility (such as a science challenge to industry) will be required to put Ireland on a pathway to net zero-carbon data centres" (DECC, 2023).*

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The Proposed Development is in line with this strategy as the GHG emissions associated with the electricity associated with the project, due to commitments in the CAP25, will reduce in line with national policy and in line with EU policy as outlined in the EU Climate Law (EU, 2021) which has outlined a legally binding target to obtain net zero GHG emissions by 2050.

The Proposed Development is in line with the Long-term Climate Action Strategy as the electricity associated with the project will operate under the ETS which has, as outlined in the EU Climate Law (EU, 2021), a legally binding target to obtain net zero GHG emissions by 2050. In addition, CAP24 and CAP25 have confirmed that the ETS is the cornerstone for industry (including electricity providers) to reduce GHG emissions in order to achieve net zero emissions by 2050.

Based on the information provided in this Chapter and in the application as whole, the foregoing analysis demonstrates that the planning authority can be satisfied that, by granting permission for the Proposed Development, it would, in so far as practicable, be performing its functions in a manner consistent with Section 15.1(b).

In relation to 15.1(c), which refers to the most recent approved national adaptation framework and approved sectoral adaptation plans, the National Adaptation Framework (NAF) (DECC, 2024) has outlined several actions to help ensure a targeted approach to achieving climate resilience into the future. These include:

- Putting in place updated National Guidance to Sectors for the preparation of Sectoral Adaptation Plans (SAPs),
- Local authorities to adopt Local Authority Climate Action Plans,
- Formalising long term operational support for key sectors,
- Drive community outreach, educating the public on risks, opportunities and impacts of climate change in Ireland and globally,
- Increasing awareness around climate adaptation and resilience,
- Integrating climate adaptation into key national plans and policies.

The NAF (DECC, 2024) further states that in terms of specific actions:

> *"In response to current and potential future impacts of climate change, there has been a surge in the implementation of relevant policies, tools and mechanisms at the national level to both mitigate and adapt to climate change. Given that the effects will be experienced for decades to come, it is crucial to establish robust, actionable, and effective measures and strategies to prepare for and respond to changing climate conditions. Climate adaptation is essential to reduce vulnerabilities and strengthen resilience to safeguard communities, sectors, regions and ecosystems against climate-related impacts. " (page 39)*

The NAF (DECC, 2024) defines climate resilience as:

> *"The capacity of a system, whether physical, social, or ecological, to absorb and respond to climate change and, by implementing effective adaptation planning and sustainable development (including governance and institutional design), to reduce the negative climate impacts while also taking advantage of any positive outcomes." (Page 18)*

The Electricity & Gas Networks Sector Climate Change Adaptation Plan (DECC, 2022) identified the key climate impacts for the energy sector as:

- Flooding / changes in precipitation / extreme events,
- Temperature rise,
- Sea level rise,
- Changes in wind energy content.

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As outlined in Section 9.2.6.2, climate proofing of the project was undertaken using the approaches outlined in the *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (EC, 2013) and *IEMA EIA Guide to Climate Change Resilience and Adaptation* (IEMA, 2020). Both documents outline a methodology for undertaking a risk assessment where there is a potentially significant impact on the project receptors due to climate change. The approach to the assessment is based on the following steps:

- Identify potential climate change risks to a project;
- Assess these risks (potentially prioritising to identify the most severe); and
- Formulate mitigation actions to reduce the impact of the identified risks.

Tables 9.4 and 9.5 outlines the GHGA significance criteria and Vulnerability Matrix respectively based on this approach.

Under Section 9.5.5 "*Impact of Climate Change on the Operational Phase*", it was noted that climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. Changes in climate may lead to a variety of impacts including:

- Increased average temperatures will lead to a greater requirement for cooling of the data centre buildings leading to greater energy use and associated GHG emissions;
- Increased rainfall will lead to a greater risk of flooding;
- Periods of drought may lead to reduction in water availability.

Section 9.5.5.1 noted that there is:

> *"The majority of the development is within Flood Zone C and the Proposed Development is within Flood Zone C which indicates that flooding is not a risk at the project locations. Additionally, the drainage for the development has been designed with an additional 20% to allow for increased rainfall in future years as a result of climate change."*

Thus, in line with the methodology outlined in Table 9.5, the likelihood of extreme weather and flooding was assessed to be of low likelihood and with a low or medium exposure leading to a finding of low vulnerability and thus a non-significant impact. *"*

In relation to 15.1(c) which refers the most recent approved national adaptation framework and approved sectoral adaptation plans, national and sectoral adaptation plans and 15.1(e) "adapting to the effects of climate change on the state", a detailed flood risk assessment has been completed for the Proposed Development and adequate attenuation and drainage have been designed to account for increased rainfall in future years.

In relation to extreme winds, the appropriate wind loadings are to be calculated in line with the requirements of IS EN 1991-1-4. Lightning protection will be provided for the buildings and designed by a specialist. Hail and fog are not predicted to significantly affect the buildings due to their design.

In relation to wildfires, the *Think Hazard!* tool developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) (2025), indicates that the wildfire hazard is classified as medium for the Waterford area. This means that there is between a 10% to 50% chance of experiencing weather that could support a problematic wildfire in the project area that may cause some risk of life and property loss in any given year. Future climate modelling indicates that there could be an increase in the weather conditions which are favourable to fire conditions, these include increases in temperature and prolonged dry periods.

However, due to the project location the risk of wildfire is significantly lessened and it can be concluded that the Proposed Development is of low vulnerability to wildfires.

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Landslide susceptibility mapping developed by GSI indicates that the Proposed Development location is not within an area that is susceptible to landslides and there are no recorded historical landslide events at the project location. It can be concluded that landslides are not a risk to the Proposed Development site.

At the detailed design stage chosen building materials will be high quality, durable and hard-wearing and chosen to withstand increased variations in temperature in the future as a result of climate change. Snow loads are to be calculated in line with the requirements of IS EN 1991-1-3 and new Met Eireann reports and mapping published in 2022.

Thus, the granting of permission for the Proposed Development will not be inconsistent with the national and sectoral adaptation plans.

Based on the information provided in this Chapter and in the application as whole, the foregoing analysis demonstrates that the planning authority can be satisfied that, by granting permission for the Proposed Development, it would, in so far as practicable, be performing its functions in a manner consistent with Section 15.1(c) and Section 15(e).

In relation to 15.1(d) the national climate objective, the 2025 CAP has stated that:

> *"Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity- rich, environmentally sustainable and climate-neutral economy. The Act also provides for a reduction of 51% in GHG emissions by 2030, compared to 2018 levels.*
>
> *The European Climate Law set legally binding EU-wide targets of reducing net GHG emissions by at least 55% by 2030, compared to 1990 levels, and achieving net-zero GHG emissions by 2050. Ireland will play its part in achieving the EU-wide 2030 target by meeting its binding targets under the Emissions Trading Scheme, Effort Sharing Regulation and Land Use, Land Use Change and Forestry Regulation" (2025 CAP, page 15)"*

Thus, the Proposed Development align with the national climate objective as the Proposed Development will be within the EU ETS which is the cornerstone of the EU's objective to reduce GHG emissions by at least 55% by 2030 (compared to 1990) and to achieve climate neutrality by 2050. As outlined in the EU Climate Law (EU, 2021) under the Item (13): "*The EU ETS is a cornerstone of the Union's climate policy and constitutes its key tool for reducing greenhouse gas emissions in a cost-effective way."*

The 2025 CAP also stresses the importance of the need for greater renewable energy in the national grid in order to meet the national climate objectives stating that:

> *"Increased deployment of onshore renewable electricity generation is key to achieving the requirements of the recast EU Renewable Energy Directive and the national climate objective." (2025 CAP, Page 123)*

In this regard, the applicant has committed to a Corporate Purchase Power Agreement which demonstrates that the energy consumed by the development on site is matched by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy.

Based on the information provided in this Chapter and in the application as whole, the foregoing analysis demonstrates that the planning authority can be satisfied that, by granting permission for the Proposed Development, it would, in so far as practicable, be performing its functions in a manner consistent with Section 15.1(d).

In regard to 15.1(e) the objectives of mitigating greenhouse gas emissions, the Proposed Development has the following benefits which will all help to mitigate greenhouse gas emissions:

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I. The Proposed Development will replace activities which have a higher GHG profile. Data centres represent a significantly more efficient means of data storage when compared to a distributed model of enterprise data storage by individuals and companies (or 'enterprise sites'). A study published in 2020 by Science Magazine found that while cloud computing productivity has grown globally by 550% between 2010 and 2018, energy consumption rose in tandem during the same period by just 6%, demonstrating the energy efficiency improvements of the industry, most notably by hyperscale data centres.

II. A range of measures will be employed which is in line with "best practice" as outlined in IEMA (IEMA, 2022) including the following:

- Artificial lighting will consist of energy efficient LED luminaires with the use of natural daylight as much as possible through the building design.
- DHW water source heat pump will be used for all spaces.
- The proposed cooling system design accommodates the installation of heat recovery plate heat exchangers to recover waste heat for reuse. The plant proposes to use motorised ventilation with heat recovery efficiency of 66%.
- The cooling solution for the data centre is a hybrid approach that combines fan wall CRAH (Computer Room Air Handler) units with free cooling chillers and direct-to-chip liquid cooling.
- Bicycle parking will be provided to promote more sustainable modes of travel.
- Electric vehicle charging will be provided which promotes more sustainable modes of travel.
- A proposed Battery Energy Storage System (BESS) will provide 114 MWe with an autonomy of 3.5 hours.
- A OCGT power generation facility will be designed to provide 203 MWe (at 10°C) output capacity to match the proposed ICT buildings power demand and operate as a demand and grid supporting asset, providing support to the electricity grid.
- PV solar panels will be installed onsite with over 29MW of input.
- The applicant is aligned with the goals and objectives of the EU Climate Neutral Data Centre Pact and is committed to leading and exceeding the target performance criteria as outlined in the EU Climate Neutral Data Centre Pact.
- The PUE will be annualised to be below 1.287 which is an improvement on the EU Climate Neutral Data Centre Pact.
- The WUE will be annualised to be below 0.000106 which is an improvement on the EU
- Climate Neutral Data Centre Pact target by 99%.

III. Measures will be implemented in line with "best practice" as outlined in IEMA (IEMA, 2022) as outlined below:

- A Corporate Purchase Power Agreement will be entered into which demonstrates that the energy consumed by the development on site is matched by new renewable energy generation in line with the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy.

Based on the information provided in this Chapter and in the application as whole, the foregoing analysis demonstrates that the planning authority can be satisfied that, by granting permission for the Proposed Development, it would, in so far as practicable, be performing its functions in a manner consistent with Section 15.1(e).

In summary, the facility will operate under the ETS and will thus be required to operate within the limits of the system which includes carbon pricing and a linear reduction in GHG emissions going forward. Economy-wide reductions that Ireland achieves towards its own national periodic targets, 2030 to 2050

(and intermediate quantitative targets), will be contributed to by the reductions achieved by those Irish installations that are part of the EU ETS. The 2050 target as outlined under the EU Climate Law is one of achieving climate neutrality ('Net Zero') by 2050 and thus aligns with the commitment Ireland has undertaken under the Climate Action and Low Carbon Development Act 2015 (as amended in 2021) and all reductions achieved by Irish EU ETS-participating installations will contribute towards that.

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Based on the above analysis of the different aspects of the statutory obligations under section 15, it is considered that a grant of permission for the Proposed Development would be in compliance with the planning authority's obligations under section 15.

Firstly, the indirect electricity emissions and the direct emissions from backup generators will both require greenhouse gas permits under the ETS in order to operate and thus the GHG emissions associated with the Proposed Development will be in line with Section 13.3.5 of the CAP25 which stresses the importance of the EU ETS in reducing industry GHG emissions.

Secondly, the electricity associated with the project, due to commitments in the CAP25, will reduce in line with national policy and in line with EU policy as outlined in the EU Climate Law (EU, 2021) which has outlined a legally binding target to obtain net zero GHG emissions by 2050.

Thirdly, the assessment of the Proposed Development has taken into account the relevant national and sectoral adaptation plans and the environmental assessment process has ensured that the Proposed Development is climate proofed.

Finally, a range of mitigation measures will be employed which will ensure that direct and indirect GHG emissions associated with the Proposed Development is minimised with residual GHG emissions fully mitigated through a CPPA.

Based on the above analysis of the different aspects of the statutory obligations under section 15, it is considered that a grant of permission for the proposed development would be in compliance with the planning authority's obligations under section 15 as a whole.

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Chapter 10 – Noise and Vibration

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10. NOISE AND VIBRATION

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10.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects on environmental noise and vibration of the proposed development, which comprises four distinct but connected areas including a new village centre, a solar farm and rewilding area including grid scale battery storage, and a data centre with associated energy centre within the townlands of Ballyduff east, Amberhill and Blackknock, Co Waterford.

10.2 Methodology

This Chapter has been prepared with reference to the following guidance documents:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (2022)
- Environmental Protection Agencies Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (2016);
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1 – Noise (2014);
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration (2014);
- BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration (1993);
- BS 6472: Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz) (1992);
- ISO 9613: Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation. (2024);
- BS 4142: 2014+A1:2019: Methods for Rating and Assessing Industrial and Commercial Sound (2019);
- United Kingdom Highways England (now National Highways) (UKHE) Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UKHE, 2020), and;
- ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels (2017).

The following methodology has been adopted for this assessment:

- Review appropriate guidance, typical local authority planning conditions, etc. in order to identify appropriate noise criteria for the site operations;
- Carry out noise monitoring at a number of locations (e.g. in the vicinity of nearest sensitive properties/boundaries) to identify existing levels of noise in the vicinity of the development;
- Development of a detailed 3D noise model to consider the Proposed Development,; and;
- Comment on predicted levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).

Appendix 10.1 presents a glossary of the acoustic terminology used throughout this document. In the first instance it is considered appropriate to review some basic fundamentals of acoustics.

10.2.1 Fundamentals of Acoustics

In order to provide a broader understanding of some of the technical discussion in this report, this section provides a brief overview of the fundamentals of acoustics and the basis for the preparation of this noise assessment.

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

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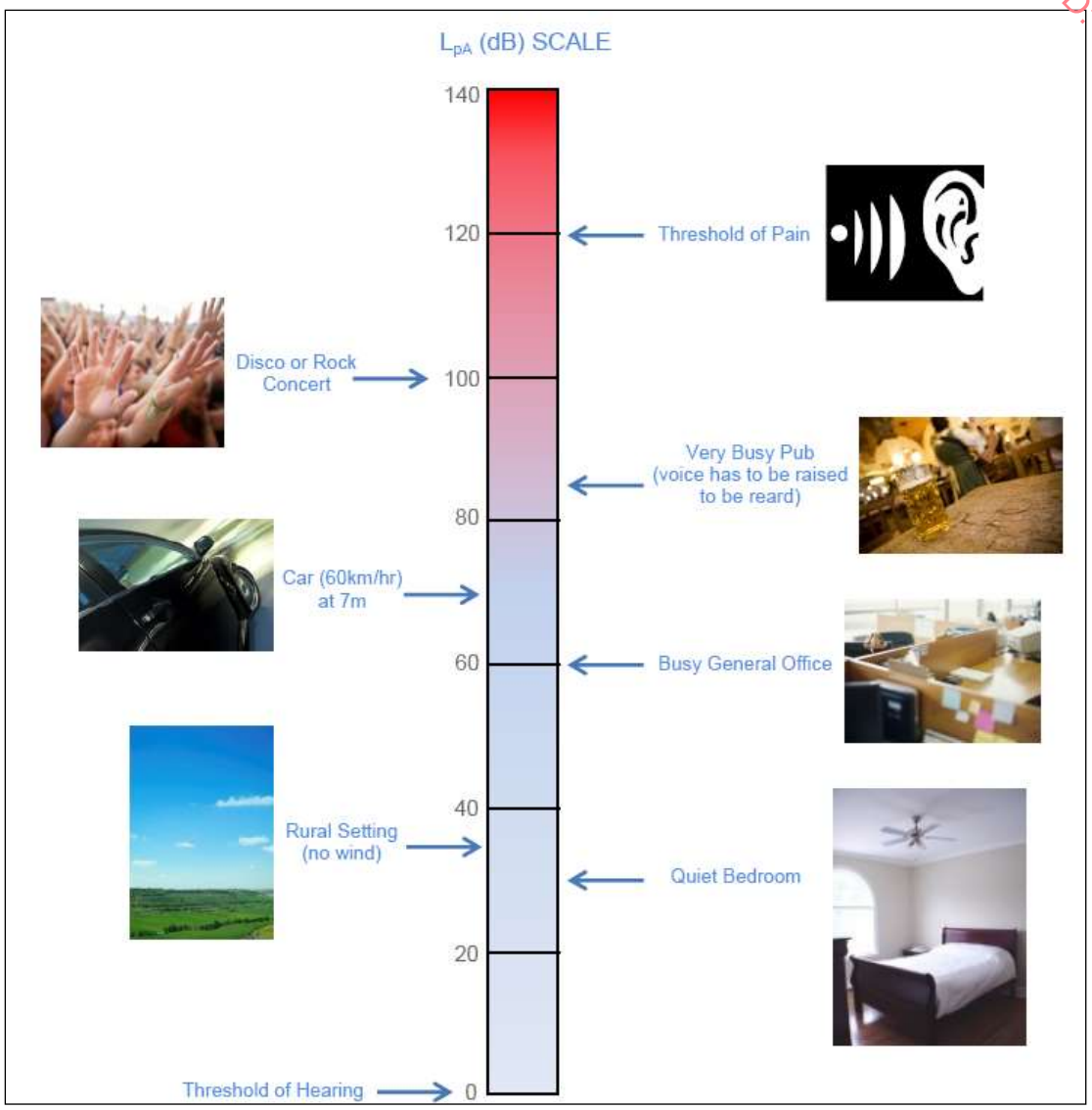
The audible range of sounds expressed in terms of Sound Pressure Levels is 0 dB (for the threshold of hearing) to 120 dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10 dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3 dB.

The frequency of sound is the rate at which a sound wave oscillates, and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250 Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the 'A-weighting' system has been found to provide one of the best correlations with perceived loudness. SPL's measured using 'A-weighting' are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 10.1.

The 'A' subscript denotes that the sound levels have been A-weighted. The established prediction and measurement techniques for this parameter are well developed and widely applied. For a more detailed introduction to the basic principles of acoustics, reference should be made to an appropriate standard text.

Figure 10.1 dB(A) Scale & Indicative Noise Levels – (EPA: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4 – 2016))

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10.2.2 Construction Phase Guidance – Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities or An Bord Pleanála normally control construction activities by imposing limits on the hours of operation and/or applying noise limits for construction noise at noise-sensitive locations.

In the absence of specific noise limits, criteria relating to permissible construction noise levels for a development of this scale are taken from British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise Annex E Section E.3.2.

10.2.2.1 ABC Method

The approach adopted in BS 5228-1 calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then

sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

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The BS 5228-1 document sets out guidance on permissible noise levels relative to the existing noise environment. Table 10.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228-1. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Table 10.1 Example Threshold of Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Note A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Note B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

Note C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

Note D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

The approach is as follows: for each period (i.e. daytime, evening and night time) the ambient noise level is determined and rounded to the nearest 5 dB. Noise monitoring carried out as part of this assessment (Refer to Section 10.3.7) indicates that the threshold values for Category A are appropriate in terms of the nearest noise sensitive locations to the west, east and south of the site, while Category B threshold values are appropriate for the NSLs to the north.

10.2.2.2 Proposed Construction Threshold Noise Levels

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- For residential NSLs to the west, east and south of the site it is considered appropriate to adopt 65 dB(A) CNT for daytime periods and Saturday mornings.
- For residential NSLs to the north of the site it is considered appropriate to adopt 70 dB(A) CNT for daytime periods and Saturday mornings due to the higher existing ambient noise levels.
- For non-residential NSLs to the north of the site it is considered appropriate to adopt the 70 dB(A) CNT.

10.2.2.3 Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 10.2 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of DMRB: Noise and Vibration and adapted to include the relevant significance effects from the EPA Guidelines (EPA 2022).

Table 10.2 Description of the Magnitude of Impacts. Adapted from DMRB Table 3.16

Construction Noise Level	Magnitude of Impact (DMRB)	EPA Significance of Effect	Determination
Below or equal Baseline Noise Level	Negligible	Not Significant	Depending on range of CNL and baseline noise level
Above Baseline and below or equal to CNT	Minor	Slight – Moderate	
Above CNT and below or equal to CNT + 5dB	Moderate	Moderate – Significant	
Above CNT + 5dB	Major	Significant – Very Significant	

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The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely effects during the construction stages.

10.2.3 Construction Phase Guidance – Traffic Noise

Vehicular movement to and from the construction site for the Proposed Development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UKHE, 2020) and the EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document. Table 10.3 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10.3 Classification of Magnitude of Traffic Noise Changes in the Short-term

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

10.2.4 Construction Phase Guidance – Vibration

There are two aspects to the issue of vibration that are addressed in the standards and guidelines: the risk of cosmetic or structural damage to buildings; and human perception of vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s. There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014); and
- British Standard BS 7385-2 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (BSI 1993)

10.2.4.1 Building Damage

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BS7385-2 and BS5228-2 advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2 may need to be reduced by up to 50%. On a cautious basis, therefore continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects. This is summarised in Table 10.4.

Table 10.4 Allowable Vibration during Construction Phase

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Values referred to are at the base of the building.

Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

BS 5228-2 and BS 7385-2 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 10.4 and major structural damage can occur at vibration magnitudes greater than four times those in Table 10.4. The guide values contained in Table 10.4 relate to predominantly transient vibration which does not give rise to resonant responses in structures, and to low rise buildings.

10.2.4.2 Human Perception

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration, however, are typically tolerated for single events or events of short duration. For example, during piling, one of the primary sources of vibration during construction, vibration levels may typically be tolerated at up to 2.5mm/s. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant to such activities during the night-time (or if they are trying to sleep during the daytime).

BS 5228-2 also provides a useful guide relating to the assessment of human response to vibration in terms of the peak particle velocity (PPV). Table 10.5 below summarises the range of vibration values and the associated potential effects on humans.

Table 10.5 Guidance on Effects of Human Response to PPV Magnitudes

Vibration Level, mm/s PPV	Description of Effect	Possible Significance Rating
≥10	Vibration is likely to be intolerable for any more than a brief exposure to a level of 10 mm/s	Very Significant

Vibration Level, mm/s PPV	Description of Effect	Possible Significance Rating
≥1 to <10	Increasing likelihood of complaints in residential environments but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents	Significant to Very Significant
≥0.3 to <1	Increasing likelihood of perceptible vibration in residential environments	Slight to Moderate
<0.3	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction	Not significant

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10.2.5 Operational Phase – Noise Guidance

10.2.5.1 EPA – NG4

An assessment of noise under the EPA NG4 guidance requires a noise survey of baseline conditions and then derives appropriate criteria for noise due to the operation of the site. The criteria apply at the façades of the noise-sensitive locations.

The first part of selecting the noise criteria is to carry out a 'quiet area' screening on the location of the site. To be considered a 'quiet area', the following three criteria are tested:

- The site must be located at least 3km from an urban area with a population of more than 1,000 people.
- The site must be at least 3 km away from any local industry.
- The site must be at least 5km away from any National Primary Route: the N25 is located less than 1km from the proposed development.

In this instance, the three criteria are met and therefore the site is not considered to be in a 'quiet area'.

Having confirmed that the site is not in a 'quiet area', the next part of the derivation of Noise criteria according to NG4 is to test whether the site meets the criteria for an 'area of low background noise'.

For a noise-sensitive location in the vicinity of the site to considered an 'area of low background noise', the noise levels measured at that location during the environmental noise survey need to satisfy all three the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Evening Period ≤35 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Night-time Period ≤30 dB L_{A90}.

Thus, depending on whether each location is considered an 'area of low background noise', Table 10.6 below outlines the noise emission limit criteria detailed in the NG4 document.

Table 10.6 NG4 Approach for Determining Appropriate Noise Criteria

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 to 23:00hrs)	Night Noise Criterion, dB L_{Aeq} (23:00 to 07:00hrs)

Areas of Low Background Noise	45 dB	40 dB	35 dB
All Other Areas	55 dB	50 dB	45 dB

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The noise levels measured during the baseline noise surveys are presented in Section 10.3.6 of this chapter. None of the locations (UN1 to UN4) exceed the 'area of low background noise' criteria during any time period (average daytime period ranges between 43 to 55 dB $L_{A90,}$ average evening period ranges between 40 to 44 dB L_{A90} and night-time period ranges between 31 to 38 dB $L_{A90)}$. Therefore the area is not considered an area of low background noise.

As the Proposed Development would continuously (i.e. on a '24/7' basis), the night-time noise criterion is critical to the assessment. As these nearest noise-sensitive locations are not identified as areas of low background noise as per the NG4 guidance, a 45 dB $L_{Aeq,T}$ night-time criterion applies. Note if plant noise were designed to this level, plant noise would be clearly audible and the dominant background source of noise at a number of noise sensitive locations in the vicinity of the development. It is appropriate to consider additional guidance in this instance.

Emergency Operation

In order to provide continuity of service a number of stand-by generators are integral to of the current proposal. These generators will only operate in a situation where there is a failure in the electricity supply from the national grid and will be tested routinely. Routine testing will be conducted during regular weekday daytime periods only. Section 4.4.1 of the Environmental Protection Agency (EPA) document "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities*" (NG4 - 2016) contains the following comments in relation to emergency plant items:

> *'In some instances, …sites will have certain items of emergency equipment (e.g. standby generators) that will only operate in urgent situations (e.g. grid power failure). Depending upon the context, it may be deemed permissible for such items of equipment to give rise to exceedances in the noise criteria/limits during limited testing and emergency operation only. If such equipment is in regular use for any purposes other than intermittent testing, it is subject to the standard limit values for the site'.*

As generators will only run if there is a loss of power to the site, or for scheduled testing during daytime periods, the noise criterion of 55 dB $L_{Aeq,T}$ on these emergency units is proposed. Generators will be designed and mitigated in order to achieve this design goal at nearby residential noise sensitive locations.

10.2.5.2 Other Guidance – BS 4142: 2014+A1: 2019

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* is the industry standard method for analysing building services plant sound emissions to residential receptors. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. It should also be noted that the EPA NG4 document indicates that the BS 4142 assessment methodology should be used in the assessment of complaints associated with a sites' operations. As an IED licence will be sought for the site, the guidance contained therein needs to be given due regard.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background sound level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS 4142 advises that penalties be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that *If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.* The following definitions as discussed in BS 4142 as summarised below:

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"*ambient sound level,* $L_{Aeq,T}$"	equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.
"*residual sound level,* $L_{Aeq,T}$"	equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.
"*specific sound level,* $L_{Aeq,T}$"	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
"*rating level,* $L_{Ar,T}$"	specific sound level plus any adjustment for the characteristic features of the sound.
"*background sound level,* $L_{A90,T}$"	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

In order to establish an *initial estimate* of impact, BS 4142 states the following:

- Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following.
- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The assessment methodology described above (i.e. comparison of rated sound level to background sound level) is quoted in BS 4142 as representing a methodology to '*obtain an initial estimate'* of impact. It is important to note that BS 4142 also comments that *'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'*. BS 4142 provides a list of potential pertinent factors that can influence the *'initial estimate'*. The plant noise assessment conducted in the following sections has been carried out with consideration of the guidance contained in BS 4142 as summarised above.

However it is also outlined in BS 4142:2014+A1:2019:

> *"Where background sound levels and rating levels are low, the predicted noise level from plant in comparison to absolute noise thresholds might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."*

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As part of the survey work undertaken to inform the assessments (See Section 10.3.6), the average night-time background noise level was below 40 dB L_{A90}. The lowest noise levels were at UN3 to the southeast of the site was 31 dB $L_{A90, 15mins}$, while the other noise levels at unattended locations ranged between 35 to 36 dB $L_{A90, 15mins}$.

Based on the review it is proposed that the plant design criteria of typically 55 dB $L_{Aeq,15min}$ during daytime periods and 35 to 40 dB $L_{Aeq,15min}$ during night-time be adopted at the façades of nearby residential properties. The night-time design criterion will dictate the design of the development from an acoustic perspective so this will be focused on in this assessment as compliance with the night time criterion infers compliance with the daytime one. The night-time criterion is considered to be approximately equivalent to the typical existing background noise level measured during night-time periods at nearby residential properties and adverse impacts would not be considered likely should noise emissions be controlled to this level.

This night-time design criterion has also been chosen with regards to BS 8233 *Guidance on sound insulation and noise reduction for buildings,* which provides guideline values for internal noise levels within residential dwellings e.g. a bedroom at night-time should not exceed 30 dB $L_{Aeq, 8hr}$. It is appropriate to derive external noise limits based on the recommended internal noise criteria. This is done by factoring in the degree of noise reduction afforded by a partially open window. Annex G in BS 8233:2014 states that,

> *"If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB"*

It is also acknowledged that the level difference through a window partially open for ventilation can vary depending on the window type and this is nominally deemed to fall in the range of 10 to 15 dB. Therefore, for = the assessment of the proposed development an inside-to-outside level difference of 10 to 15 dB would permit the plant to operate between 40 to 45 dB $L_{Aeq, 8hr}$, which is inline with the absolute criteria set out in EPA NG4 for the night-time period and in agreement with BS4142 where an area has a low background noise e.g. 31 dB at UN3.

Non-residential Properties

The Kilmeaden Health Clinic is located to the north of the proposed development. In terms of noise emissions from the site it is considered that an appropriate noise criterion at this location is 55 dB $L_{Aeq,15min}$, which corresponds to the noise criterion for daytime periods in NG4.

10.2.5.3 Recommended Criteria

Following review of relevant guidance, the following noise criteria are proposed for the Proposed Development:

- Day to Day Operation – Day-time period- (Residential Noise Sensitive) – 55 dB $L_{Aeq,15min}$
- Day to Day Operation – Evening period- (Residential Noise Sensitive) – 50 dB $L_{Aeq,15min}$
- Day to Day Operation – Night-time period (Residential Noise Sensitive) – 45 dB $L_{Aeq,15min}$
- Day to Day Operation (Non-residential Noise Sensitive) – 55 dB $L_{Aeq,15min}$
- Emergency Operation (Noise Sensitive) – 55 dB $L_{Aeq,15min}$

Note plant noise emissions are to be designed such that they are not tonal and do not have impulsive characteristics at the nearest noise sensitive locations.

10.2.5.4 Assessment of Significance

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The 'Guidelines for Environmental Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the Proposed Development.

The guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

The scale adopted in this assessment is shown in Table 10.7 below is based on an example scale within the IEMA guidelines. The corresponding significance of effect from in the EPA's EIA Report Guidelines (2022) is also presented.

Table 10.7 Noise Effect Scale

Noise Level Change dB(A)	Subjective Response	Impact Guidelines for Noise Impact Assessment Significance (Institute of Acoustics)	Effect Guidelines on the Information to be contained in EIARs (EPA)
0	No change	None	Imperceptible
0.1 – 2.9	Barely perceptible	Minor	Not Significant
3.0 – 4.9	Noticeable	Moderate	Slight, Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial	Significant
10.0 or more	More than a doubling or halving of loudness	Major	Profound

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in the above table provide a good indication as to the likely significance of changes on noise levels and have been used to assess the impact of operational noise.

10.2.6 Operational Phase – Vibration Guidance

Guidance as to an acceptable magnitude of vibration during the operational phase of the development is taken from British Standard BS 6472 (1992): Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz). The Standard contains recommendations that continuous vibration in residential buildings should not exceed nominally 0.3mm/s by daytime and 0.2mm/s by night-time.

It should be noted that the Proposed Development will not give rise to any significant levels of vibration off site and therefore the associated impact is not significant.

10.2.7 Operational Phase – Additional Traffic

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 10.8 10.8 offers guidance as to the likely impact associated with any particular change in traffic

noise level based on the DMRB LA 111 Noise and Vibration (UKHE 2020) and the EPA Guidelines (EPA, 2022).

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Table 10.8 Classification of Magnitude of Traffic Noise Changes in the Long-term

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0.0 – 0.9	Inaudible	Negligible	Imperceptible
1.0 – 2.9	Barely Perceptible	Not Significant	Not Significant
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very Significant

10.2.8 Forecasting Methods and Difficulties Encountered

Construction noise calculations have been conducted generally in accordance with BS 5228: 2009+A1:2014: Code of practice for noise control on construction and open sites - Noise.

Prediction calculations for building services noise, car park activity and vehicle movements on site have been conducted generally in accordance with ISO 9613 (2024): Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation.

Changes in road traffic noise on the local road network have been considered using prediction guidance contained within Calculation of Road Traffic Noise (CRTN) issued by the Department of Transport in 1988.

10.3 Receiving Environment

In the first instance it is considered appropriate to define a noise sensitive location. In this context, it is considered prudent to give consideration to adopt the definition supplied by the Environmental Protection Agency (EPA) which states the following in NG4 Appendix I:

> *NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.*

Figure 10.2 highlights the nearest noise sensitive locations to the proposed development. Table 10.9 presents details of each NSL.

Table 10.9 Nearest NSLs from Proposed Development

NSL Ref.	Description	Approx. Distance to Proposed Development
		RLB
NSL01	Residential, to northwest of energy centre	20m
NSL02	Residential, to northwest of energy centre and power generation facilities	15m
NSL03		20m
NSL04		15m
NSL05		5m
NSL06	Residential, to west of village centre and north of power generation facilities	5m
NSL07		5m
NSL08	Commercial- Kilmeaden Health Clinic to east of village centre and northeast of power generation facilities	5m
NSL09		80m

NSL Ref.	Description	Approx. Distance to Proposed Development RLB
NSL10	Residential along R680, east of village centre and northeast of power generation facilities	95m
NSL11		90m
NSL12	Residential along R681, northeast of warehouses and east of power generation facilities	90m
NSL13		110m
NSL14	Residential south of warehouses and energy centre and east of solar farm	5m
NSL15		25m
NSL16		50m
NSL17		25m
NSL18		15m
NSL19		15m
NSL20	Residential west of warehouses, south of energy centre and solar farm	5m
NSL21		15m
NSL22		5m
NSL23	Residential southeast of solar farm	35m
NSL24	Residential southwest of solar farm	240m
NSL25	Residential west of solar farm	610m
NSL26	Residential west of BESS	210m
NSL27	Residential northwest of BESS and west of solar farm	90m
NSL28	Apartments within the village centre and development itself, to north of energy centre	--
NSL29		--

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10.3.1 Choice of Measurement Locations

Baseline noise monitoring has been completed at a number of representative locations in the vicinity of the development and is reviewed here to inform the characterisation of the existing noise environment. Figure 10.2 illustrates the approximate location of the noise monitoring locations.

10.3.1.1 Unattended Noise Monitoring Locations

There were four unattended monitoring locations, which are described below.

UN1 Located in a field to the northwest of site, representative of the receiving environment at the proposed energy centre, power generation and BESS facilities, and residential properties to the northwest of the Proposed Development (NSL1-5,NSL26-27).

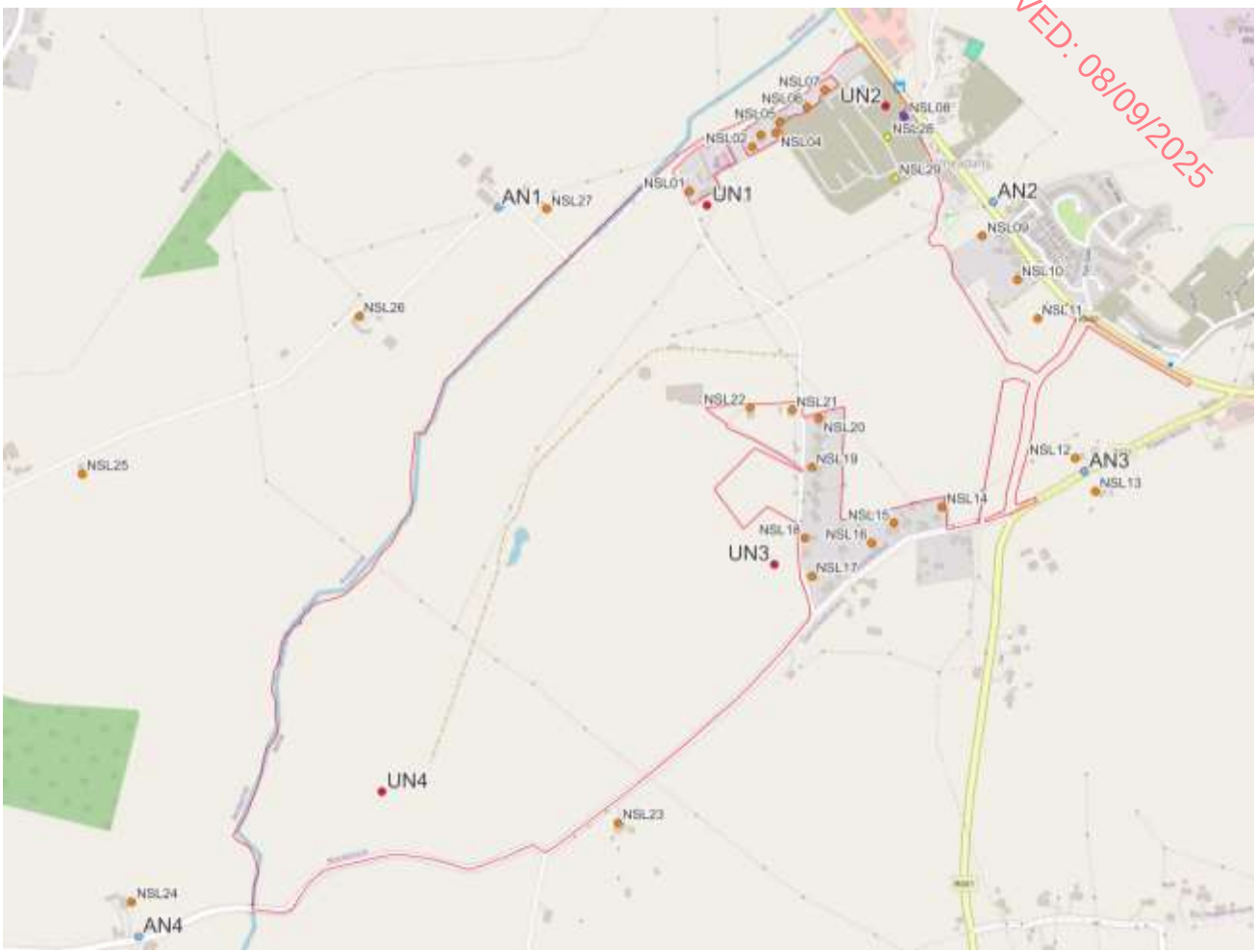
UN2 Located in a vacant site along the north of the site, overlooking the R680 road. It is representative of the receiving environment of at the proposed village centre and residential / commercial properties to the northeast of the Proposed Development (NSL6-13 and NSL28-29).

UN3 Located in a field to the southeast of the site. It is representative of the receiving environment at the proposed solar farm and warehousing, and residential properties to the southeast of the Proposed Development (NSL14-22).

UN4 Located at the southern boundary of the site, representative of the receiving environment at the proposed location for the solar farm, landing zone and customer compound, and residential properties to the south, southwest and west of the Proposed Development (NSL23-NSL25).

Figure 10.2 Noise Sensitive Locations (NSL), Noise Monitoring Locations (NML) and Proposed Development RLB

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10.3.1.2 Attended Noise Monitoring Locations

There were four attended noise monitoring locations, which are described below.

AN1 Located near rural noise sensitive locations approximately 115 m from the northwestern boundary of the site at a height of 1.5m.

AN2 Located near noise sensitive locations at Fan Glas estate, along the R680 approximately 105 m from the sortheastern boundary of the site at a height of 1.5m.

AN3 Located near rural noise sensitive locations overlooking the R681 road, approximately 205 m from the southeastern boundary of the site at a height of 1.5m.

AN4 Located near rural noise sensitive locations approximately 185 m from the southwestern boundary of the site at a height of 1.5m.

10.3.2 Measurement Periods

Unattended noise measurements were conducted during typical day, evening and night-time periods. The night survey represents the time of night that provides a measure of existing environment noise levels during a period where people are attempting to go to sleep or are sleeping.

The unattended measurement periods are indicated in Table 10.10.

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Table 10.10 Unattended NML Survey Period

Location	Start Date	End Date
UN1	26 November 2024 14:37	29 November 2024 17:52
UN2	25 November 2024 14:01	26 November 2024 14:01
UN3	25 November 2024 14:49	28 November 2024 17:19
UN4	25 November 2024 15:53	3 December 2024 17:05

During the 29th to 30th December 2024 there were periods of rainfall which have been excluded from UN4 data analysis.

The attended measurements were undertaken during the daytime period, between 16:15 hrs on the 25th of November and 12:30 hrs on the 26th of November 2024. Weather conditions were dry and calm with the wind speed less than 5 m/s.

10.3.3 Personnel and Instrumentation

AWN staff installed and collected the noise and vibration monitoring equipment. The following instrumentation were used in conducting the noise surveys.

Table 10.11 Instrumentation Details

Location	Equipment	Serial Number	Last Calibration Date
AN1, AN2, AN3 and AN4	NTiAudio XL2	A2A-11092-E0	20/05/2024
UN1 and UN2	RION NL-52	575782	04/09/2023
UN3	RION NL-52	976162	19/09/2024
UN4	Larson Davis LxTl	6122	29/03/2023
Calibrator	Larson Davis CAL200	2371	02/07/2024

Before and after each survey period, the measurement instruments were was check calibrated using a Larson Davis CAL200 Sound Level Calibrator.

10.3.4 Measurement Procedure

Measurements were conducted at the locations noted above. Sample periods for the noise measurements were typically 15 minutes for both the unattended and attended noise surveys.

During the attended survey the results were noted onto a Survey Record Sheet immediately following each sample and all data (for both the unattended and attended surveys) was saved to the instrument memory for post analysis. Survey personnel noted the primary noise sources contributing to noise build-up.

10.3.5 Measurement Parameters

The noise survey results are presented in terms of the following three parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

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10.3.6 Unattended Noise Survey Results

Noise level measurements over 72 hours' duration with 15-minute internals were taken at locations UN1 to UN4. The results are presented in Table 10.12 below. It should be noted that a logarithmic average is used for the average L_{Aeq} parameter, while an arithmetic average is used for the average L_{A90} parameters.

Table 10.12 Summary of Unattended Measurement Results

Location	Period	Sound Pressure Level (dB re. 2x10-5 Pa)	
		$L_{Aeq, 15mins}$	$L_{A90, 15mins}$
UN1	Average Day	51	46
	Average Evening	48	43
	Average Night	43	35
UN2	Average Day	63	55
	Average Evening	58	44
	Average Night	53	36
UN3	Average Day	49	45
	Average Evening	44	38
	Average Night	40	31
UN4	Average Day	52	38
	Average Evening	40	37
	Average Night	42	36

The average day-time noise levels across the site ranged between 49 to 63 dB $L_{Aeq,15mins}$ and between 38 to 55 dB $L_{A90, 15mins}$. The quietest noise levels during the average daytime periods were at UN4 to the south of the site.

Regardless of unattended noise monitoring location across the site, the night-time average noise levels were all below 40 dB $L_{A90, 15mins}$ (ranging between 31 to 36 dB $L_{A90, 15mins}$. UN3 to the southeast of the site (in close proximity to NSL14-22) had the lowest average night-time value of 31 dB $L_{A90, 15mins}$.

10.3.7 Attended Noise Survey Results

Noise level measurements of 15-minute durations were taken at location AN1 to AN4. The survey results for the daytime attended monitoring are given in Table 10.13.

Table 10.13 Attended Noise Monitoring Results

Location	Date and Start Time (hrs)	Sound Pressure Level (dB)		
		$L_{Aeq,15mins}$	$L_{Amax, 15 mins}$	$L_{A90,15mins}$
AN01	25/11/2024 17:22	51	75	37
	26/11/2024 10:51	48	71	39
	26/11/2024 12:12	45	68	37
AN02	25/11/2024 17:01	74	84	66
	26/11/2024 10:31	73	85	59
	26/11/2024 11:53	73	87	58
AN03	25/11/2024 16:43	74	90	47
	26/11/2024 10:12	72	89	47
	26/11/2024 11:33	71	92	43

Location	Date and Start Time (hrs)	Sound Pressure Level (dB)		
		$L_{Aeq,15mins}$	$L_{Amax,\ 15\ mins}$	$L_{A90,15mins}$
AN04	25/11/2024 16:17	55	79	33
	26/11/2024 09:51	54	79	35
	26/11/2024 11:14	52	76	36

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At AN1, the noise environment mostly consisted of distant and occasional local road traffic, farm-related activity in a shed nearby, leaf rustle and birdsong. Ambient noise levels were in the range between 45 to 51 dB $L_{Aeq,15min}$. Background noise levels were in the range between 37 to 39 dB $L_{A90,15min}$.

At AN2, local and distant road traffic noise was a dominant source, due to its location in Kilmeadan village itself. Local vehicles were passing the meter at high speeds. Birdsong and wind related foliage noise was also recorded. Ambient noise levels were in the range between 73 to 74 dB $L_{Aeq,15min}$. Background noise levels were in the range between 58 to 66 dB $L_{A90,15min}$

At AN3, road traffic was a dominant source as local vehicles passed at high speeds in close proximity to the meter, as well as distant road traffic being audible between lulls of local traffic. Birdsong and foliage noise due to wind was also noted. Ambient noise levels were in the range between 71 to 74 dB $L_{Aeq,15min}$. Background noise levels were in the range between 71 to 74 dB $L_{A90,15min}$.

At AN4, road traffic was less frequent and dominant of a noise source, although vehicles did occasionally pass. Distant road traffic was audible along with leaf rustle due to light wind and birdsong. There was also occasional farmwork being carried out in a nearby field, and a barking dog in the distance. Ambient noise levels were in the range between 52 to 55 dB $L_{Aeq,15min}$. Background noise levels were in the range between 33 to 36 dB $L_{A90,15min}$.

10.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

The Proposed Development will involve the construction of the proposed new village centre, a solar farm and battery storage, and a data centre with associated energy centre and associated ancillary development. When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- construction phase, and;
- operational phase.

10.4.1 Construction Phase

The construction phase will involve extensive excavation, rock breaking, general site preparation over the development site and the erection of the new building over a phased construction period. An assessment will also be presented in the following sections in relation to noise from construction traffic on local roads.

10.4.2 Operational Phase

The primary sources of outward noise in the operational context are deemed long term and will involve:

- building services noise;
- emergency site operations, and;
- additional vehicular traffic on public roads.

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10.5 Potential Impacts of the Proposed Development

10.5.1 Construction Phase

The construction stage will be undertaken over a number of phases from site preparation through to building construction and internal fit out. In terms of the potential noise and vibration impacts, the key stages and activities are expected to involve:

- Ground works (excavation and piling);
- Superstructure Construction; and Internal fit out.

The construction programme will create typical construction activity related noise onsite. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in British Standard Institute (BSI) BS 5228-1:2009 +A1:2014 *Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise* (2014) . This standard sets out sound power / sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels.

The following section discusses typical noise levels associated with the proposed development demolition/construction phase and comments on potential noise impacts at distances to the nearest Noise Sensitive Locations (NSLs) during the key stages and types of activities that will occur on site.

10.5.1.1 Excavation and Piling

For construction works associated with activities such as excavation and structural works including excavators, loaders, dozers, cranes, generators, concreting works and continuous flight augured piling etc. noise levels are typically in the range of 70 to 82 dB L_{Aeq} at 10m. Non-percussive piling methods will be employed on the site. The main body of works related to piling and rock breaking will take place at the energy centre over a two month period. A total construction noise level of 85 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example three items of plant at 78 dB L_{Aeq} and one item of plant at 82 dB L_{Aeq} operating simultaneously within a work area.

10.5.1.2 Construction of Proposed Structure

For construction work areas with lower noise levels such as those associated with superstructure works including site compounds (for storage, offices and material handling, generators etc.), smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 80 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example two items of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

10.5.1.3 Indicative Construction Noise Levels

Indicative noise calculations have been undertaken which assume that plant items are operating for 66% of the time. It must be stated that for most of the time, plant and equipment will be a greater distance from the nearest NSLs than those used within the calculations and the "on-time" of plant and equipment will be less than those assumed over a normal working day (i.e. the use of piling rigs or breakers will be in use for shorter periods than those assumed over a normal working day) and consequently will have lower noise levels. Partial screening from a standard 2.4m construction hoarding has been assumed in these calculations. The assessment presented is therefore representative of a best estimate conservative

scenario representing construction activities. Table 10.14 presents the calculated noise levels at varying distances.

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Table 10.14 Calculated Construction Noise Levels at Varying Distances

Activity	Predicted Construction Noise Level $L_{Aeq(1hour)}$ (dB)					
	20m	25m	35m	100 m	200 m	300 m
Excavations and Piling Works	70	68	65	55	48	44
General Site Work including Superstructure and Fit out	65	63	60	50	43	39

Reference to the construction noise levels in Table 10.14 indicate that the daytime CNT of 65 dB $L_{Aeq,T}$ will be not exceeded when the noisiest excavation works are occurring at distances greater than 35m from the closest residential NSLs or during general site works (including landscaping), at distances greater than 20m from the site boundary.

10.5.1.3.1 Village Centre

The closest NSLs are located to the north of the site where the village centre will be constructed (5m from site boundary and 20m from buildings) and are likely to exceed the CNT during construction works. However, a range of noise levels will occur as works take place across the site. Piling works are likely to occur at distances greater than 100m from the closest NSLs and therefore are significantly below the CNT. At the closest NSLs to the north, the mitigation measures are required to reduce the construction noise levels below the 70 dB $L_{Aeq,T}$ CNT when within 15m of general site works and 20m of excavation works. These measures are outlined in Section 10.6.1.

10.5.1.3.2 Battery Storage

The closest NSLs are located to the west of the site where the BESS will be constructed (110m from site boundary and 190m from structures) and are unlikely to exceed the CNT during construction works. The resultant noise effects are negative, not significant and short-term at those closest NSLs to the BESS construction works. Aside from the site perimeter hoarding, no specific mitigation measures are required for this phase of construction.

10.5.1.3.3 Solar Farm

The closest NSLs are located to the southeast of the site where the solar farm will be constructed (20m from site boundary and 35m from structures) and are likely to exceed the CNT during construction works. However, a range of noise levels will occur as works take place across the site. Piling works are likely to occur at distances greater than 100m from the closest NSLs and therefore are significantly below the CNT. At the closest NSLs to the southeast, the mitigation measures are required to reduce the construction noise levels below the 65 dB $L_{Aeq,T}$ CNT when within 20m of general site works and 35m of excavation works. These measures are outlined in Section 10.6.1.

10.5.1.3.4 Data Centre and Associated Energy Centre including Warehouses

The closest NSLs are located to the northeast and southeast of the site where the data centre buildings will be constructed (15m from site boundary and 80m from structures) and are likely to exceed the CNT during general site construction works. However, a range of noise levels will occur as works take place across the site. Piling works are likely to occur at distances greater than 80m from the closest NSLs and therefore are significantly below the CNT. The resultant noise effects from excavations and piling works are negative, not significant and short-term at those closest NSLs to the datacentre construction works.

At the closest NSLs to the northeast and southeast, the mitigation measures are required to construction noise levels below the 65 dB $L_{Aeq,T}$ CNT when within 20m of general site works. These measures are outlined in Section 10.6.1.

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10.5.1.4 Construction Vibration

Expected vibration levels during piling assuming augured or bored piles have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: *Vibration,* publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- 0.54 mm/s at a distance of 5m, for auguring;
- 0.22 mm/s at a distance of 5m, for twisting in casing;
- 0.42 mm/s at a distance of 5m, for spinning off, and;
- 0.43 mm/s at a distance of 5m, for boring with rock auger.

Taking into account the distance to the closest off site sensitive buildings on all perimeters, vibration emissions from this activity will be significantly reduced. Vibration levels at the closest neighbouring buildings will be orders of magnitude below the limits set out in Table 10.4 to avoid any cosmetic damage to buildings, and will be below the thresholds for human perception. The resultant vibration effects are ***negative, not significant*** and ***short-term.***

10.5.1.5 Construction Traffic

In terms of the additional construction traffic on local roads that will be generated as a result of the Proposed Development the following comment is presented: Considering that in order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction phase associated with various phases of the development, as outlined in the relevant sections of Chapter 13 will not result in a significant noise impact.

In accordance with the criteria in Table 10.3, the associated effect is described as 'not significant'. The resultant noise effects are ***negative, not significant*** and ***short-term.***

10.5.2 Operational Phase

The primary sources of outward noise from the Proposed Development in the operational context are deemed long term and will involve:

- power plants and building services noise;
- emergency site operations;
- Village centre, battery storage and solar farm plant, and;
- additional vehicular traffic on public roads.

These issues are assessed in detailed in the following sections. See Appendix 10.4 for details of the noise modelling undertaken for this assessment and associated input information.

10.5.2.1 Power Plants / Building Services Noise / Emergency Site Operation

Three scenarios have been developed to consider the noise impact of the proposed operations. These are as follows:

- Scenario A: Day-to-day operations of the Energy Centre and Data Centre;
- Scenario B: Emergency Operations in the event of an interruption in electricity supply to the site, where the backup generators are used;

- Scenario C: Generator Testing at scheduled day-time periods.

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Scenario A would is the most representative of the day to day operation. Scenario B is representative of emergency situation when a power outage or issue with supply from the national grid has occurred and is therefore required to keep the data centres operation on electricity from the emergency generators. It should be noted that such an event is an extremely rare occurrence.

Scenario C considers the impact associated with the occasional testing of emergency generators. Only one generator unit will be tested at any one time. 'Generators from both Data Centre and Energy Centre are considered. Emergency generators from Data Centre has relatively higher noise impact and are presented here. The predicted noise level for Scenario C presented here assume that the closest generator to existing noise sensitive locations is being tested.

The results of the iterations of the noise model are presented and are compared to the relevant noise criteria as adopted for this assessment in Table 10.15. Note all plant will be selected such that no tonal noise emissions are evident at noise sensitive locations.

Noise contours are presented for the scenarios described in order to demonstrate the noise impact of the Proposed Development over a wider area in Figure 10.3, Figure 10.4 and Figure 10.5.

It should be noted that the testing of generators shall take place only between 09.00 and 17.00 hrs.

Table 10.15 Comparison of Predicted Noise Levels vs. Adopted Noise Criteria

Location	Scenario A			Scenario B			Scenario C		
	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?
NSL01	37	45	✓	40	55	✓	37	55	✓
NSL02	41		✓	43		✓	41		✓
NSL03	41		✓	42		✓	41		✓
NSL04	40		✓	42		✓	40		✓
NSL05	39		✓	43		✓	39		✓
NSL06	38		✓	41		✓	38		✓
NSL07	34		✓	39		✓	34		✓
NSL08	39		✓	42		✓	39		✓
NSL09	34		✓	47		✓	34		✓
NSL10	31		✓	49		✓	32		✓
NSL11	30		✓	49		✓	39		✓
NSL12	28		✓	51		✓	38		✓
NSL13	28		✓	51		✓	37		✓
NSL14	24		✓	40		✓	29		✓
NSL15	32		✓	43		✓	33		✓
NSL16	31		✓	46		✓	34		✓
NSL17	30		✓	44		✓	30		✓
NSL18	31		✓	43		✓	33		✓
NSL19	33		✓	42		✓	35		✓
NSL20	36		✓	53		✓	42		✓
NSL21	36		✓	51		✓	42		✓
NSL22	37		✓	47		✓	40		✓

Location	Scenario A			Scenario B			Scenario C		
	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?
NSL23	25		✓	38		✓	27		✓
NSL24	22		✓	34		✓	25		✓
NSL25	25		✓	32		✓	27		✓
NSL26	29		✓	35		✓	31		✓
NSL27	34		✓	40		✓	35		✓
NSL28	34		✓	43		✓	34		✓
NSL29	35		✓	49		✓	35		✓

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Figure 10.3 Scenario A – Noise Contour for Day to Day Operations

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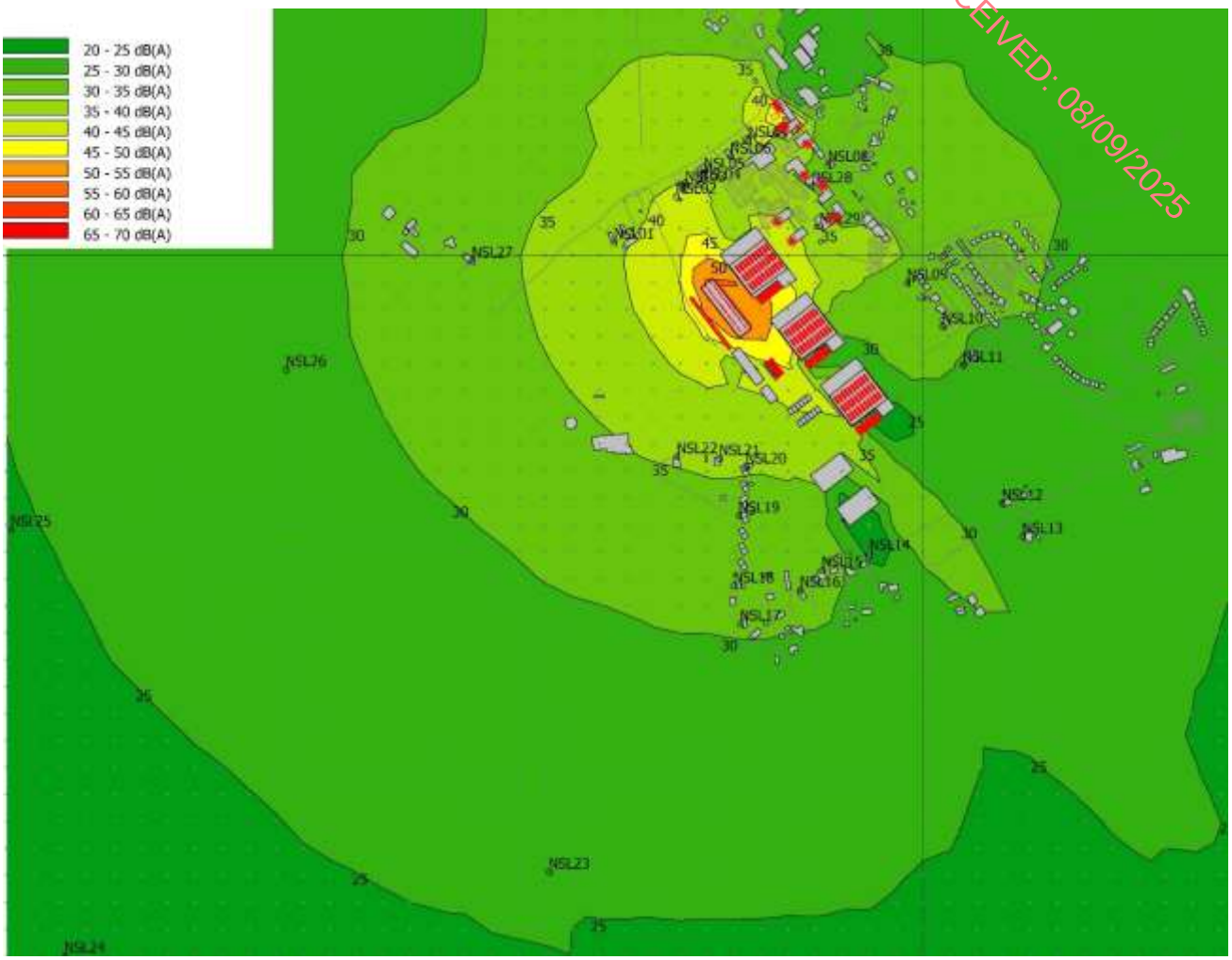
Figure 10.4 Scenario B – Noise Contour for Emergency Operations

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Figure 10.5 Scenario C – Noise Contour for Generator Test

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Scenario A Noise levels at all locations comply with the adopted criterion of 45dB $L_{Aeq,T}$ in relation to day to day operations. Figure 10-3 presents a noise contour for Scenario A. Scenario A is compared against the night-time criterion due to the continual operational of the source.

Scenario B All locations are within the relevant adopted emergency operation limit of 55 dB $L_{Aeq,T}$ in the rare event that a power loss to the site occurs. Figure 10-4 presents a noise contour for Scenario B.

Scenario C All locations are within the relevant adopted daytime limit of 55 dB $L_{Aeq,T}$ by a significant margin during periods when a single generator is undergoing routine testing. Figure 10-5 presents a noise contour for Scenario C.

The above predicted levels are based on a situation where the receiver is downwind of all noise sources. For the purposes of the assessment against the adopted criteria this is a robust and highly conservative assumption.

10.5.2.2 Summary

Scenario A is representative of the typical day to day operations envisioned for the site. Review of the predicted noise levels and associated noise contours confirms that the site-specific levels comply with the noise criterion adopted for this assessment.

Scenario B is representative of emergency situations such as a power outage on the national grid. Review of the predicted noise levels and associated noise contours confirm that the site-specific levels comply with the noise criterion that has been adopted for these situations following review of relevant guidance.

Scenario C is representative of the intermittent testing of generator units. Review of the predicted noise levels and associated noise contours confirm that the site-specific levels comply with the relevant daytime noise criterion relevant to these proposed activities.

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10.5.2.3 Review of Increases in Noise Level

The predicted changes in noise level associated with the development at the nearest noise sensitive locations to the site are presented in Table 10.16 for daytime and Table 10.17 for nighttime.

Table 10.16 Review of Predicted Changes in Existing Noise Levels (day time)

Loc.	Scenario A – Typical Operation Day Time				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Effects
NSL01	37	46	46.5	+0.5	Imperceptible
NSL02	41	46	47.2	+1.2	Imperceptible
NSL03	41	46	47.2	+1.2	Imperceptible
NSL04	40	46	47	+1	Imperceptible
NSL05	39	46	46.8	+0.8	Imperceptible
NSL06	38	55	55.1	+0.1	Imperceptible
NSL07	34	55	55	0	Imperceptible
NSL08	39	55	55.1	+0.1	Imperceptible
NSL09	34	55	55	0	Imperceptible
NSL10	31	55	55	0	Imperceptible
NSL11	30	55	55	0	Imperceptible
NSL12	28	55	55	0	Imperceptible
NSL13	28	55	55	0	Imperceptible
NSL14	24	45	45	0	Imperceptible
NSL15	32	45	45.2	+0.2	Imperceptible
NSL16	31	45	45.2	+0.2	Imperceptible
NSL17	30	45	45.1	+0.1	Imperceptible
NSL18	31	45	45.2	+0.2	Imperceptible
NSL19	33	45	45.3	+0.3	Imperceptible
NSL20	36	45	45.5	+0.5	Imperceptible
NSL21	36	45	45.5	+0.5	Imperceptible
NSL22	37	45	45.6	+0.6	Imperceptible
NSL23	25	38	38.2	+0.2	Imperceptible
NSL24	22	38	38.1	+0.1	Imperceptible
NSL25	25	38	38.2	+0.2	Imperceptible
NSL26	29	46	46.1	+0.1	Imperceptible
NSL27	34	46	46.3	+0.3	Imperceptible
NSL28	34	55	55	0	Imperceptible
NSL29	35	55	55	0	Imperceptible

Review of the predicted increases in noise level at the nearest noise sensitive locations conclude that the associated impact is ***'imperceptible'*** during day time.

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Table 10.17 Review of Predicted Changes in Existing Noise Levels (nighttime)

Loc.	Scenario A – Typical Operation Night Time				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level (dB(A))	Change in Noise Level (dB)	EPA Glossary of Effects
NSL01	37	35	39.1	+4.1	Slight, Moderate
NSL02	41	35	42	+7	See text
NSL03	41	35	42	+7	See text
NSL04	40	35	41.2	+6.2	See text
NSL05	39	35	40.5	+5.5	See text
NSL06	38	36	40.1	+4.1	Slight, Moderate
NSL07	34	36	38.1	+2.1	Imperceptible
NSL08	39	36	40.8	+4.8	Slight, Moderate
NSL09	34	36	38.1	+2.1	Imperceptible
NSL10	31	36	37.2	+1.2	Imperceptible
NSL11	30	36	37	+1	Imperceptible
NSL12	28	36	36.6	+0.6	Imperceptible
NSL13	28	36	36.6	+0.6	Imperceptible
NSL14	24	31	31.8	+0.8	Imperceptible
NSL15	32	31	34.5	+3.5	Slight, Moderate
NSL16	31	31	34	+3	Slight, Moderate
NSL17	30	31	33.5	+2.5	Imperceptible
NSL18	31	31	34	+3	Slight, Moderate
NSL19	33	31	35.1	+4.1	Slight, Moderate
NSL20	36	31	37.2	+6.2	See text
NSL21	36	31	37.2	+6.2	See text
NSL22	37	31	38	+7	See text
NSL23	25	36	36.3	+0.3	Imperceptible
NSL24	22	36	36.2	+0.2	Imperceptible
NSL25	25	36	36.3	+0.3	Imperceptible
NSL26	29	35	36	+1	Imperceptible
NSL27	34	35	37.5	+2.5	Imperceptible
NSL28	34	36	38.1	+2.1	Imperceptible
NSL29	35	36	38.5	+2.5	Imperceptible

At locations NSL 2 – 5 and NSL 20 – 22, an increase of the order of 5.5 to 7 dB is indicated. However, the predicted noise levels of 40.5 – 42 dB(A) remains within the EGA NG4 criterion of 45 dB(A) $L_{Aeq,T}$. Similarly, the effects are therefore considered '***slight*** to ***moderate***'.

10.5.2.4 BESS and Solar Farm Plant

Significant noise contribution from the BESS and solar farm plant to the identified NSLs are not expected. Any required plant items will be selected, designed and located so that there is no negative impact on sensitive receivers within the development itself. Once the relevant noise criteria are not exceeded within the proposed development, the related noise impact to existing NSLs offsite will be ***neutral*** to ***negative, imperceptible*** to ***slight*** and ***long-term.***

In this instance, best practice is to set appropriate noise limits that will inform the detailed design during the selection and layout of the plant associated with the BESS and Solar Farm for the proposed development. The cumulative operational noise level from the BESS and Solar Farm plant at the nearest NSLs will be designed/attenuated to not exceed the noise criterion adopted for this assessment or the design criteria for night-time period outlined in Section 10.2.5.2.

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10.5.2.5 Additional Vehicular Traffic on Public Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site. The predicted change in noise levels due to an increase in road traffic has been calculated based on information in the Traffic and Transport Assessment prepared for the proposed development. Figure 10.6 illustrates the road links assessed as part of this study.

Figure 10.6 Road Links for Traffic Assessment



Traffic flows along the surrounding road network in terms of Annual Average Daily Traffic (AADT) for the Do Nothing (DN) and Do Something (DS) scenarios have been reviewed to calculate the change in traffic noise. Table 10.18 summarises the AADT for the Proposed Development DN and DS scenarios across the 17 no. links. The impact from the increase in traffic from the proposed development has been assessed for the year 2029 and the year of 2044 relative to the scenario Do Minimum + Committed Development + Proposed Development as refenced in the Traffic and Transport Assessment. Table 10.18 presents the changes in traffic noise levels.

Table 10.18 Predicted Change In Noise Level associated with Vehicular Traffic

Ref.	Road	DN AADT 2029	DS AADT 2029	Increase in noise level dB	DN AADT 2044	DS AADT 2044	Increase in noise level dB
1	R680	6,759	7,398	+0.1	7,806	8,445	+0.1
2	N25	12,927	13,109	0.0	15,180	15,363	0.0

Ref.	Road	DN AADT 2029	DS AADT 2029	Increase in noise level dB	DN AADT 2044	DS AADT 2044	Increase in noise level dB
3	R680	12,392	14,129	+0.1	14,323	16,060	+0.1
4	N25	16,935	17,851	0.0	19,785	20,700	0.0
5	R680	13,675	15,782	+0.1	15,756	17,862	+0.1
6	L4020	3,154	3,524	+0.3	3,603	3,972	+0.2
7	Lacka Road	235	255	+0.1	295	314	0.0
8	R680	13,812	16,077	+0.2	15,896	18,162	+0.1
9	R680	13,658	15,969	+0.2	15,691	18,002	+0.1
10	Amberhill	616	658	+0.1	722	764	+0.0
11	R680	15,015	17,167	+0.1	17,259	19,411	+0.1
12	R681	3,692	3,954	+0.1	4,294	4,556	0.0
13	L4039	667	682	+0.1	764	779	+0.1
14	R680	15,394	17,073	+0.1	17,658	19,338	+0.1
15	R682	5,929	6,386	+0.1	6,843	7,300	+0.1
16	R680	13,059	15,492	+0.7	14,779	17,211	+0.7

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Predicted increases in traffic noise levels on existing roads are in the range 0.0 to +0.7 dB L_{A10}. In accordance with the criteria in Table 10.18 the associated effect is described as imperceptible to not significant.

The new access road to the site at Link 17, has an AADT of 3,439 AADT DS in 2029 and 2044. There is no traffic in the DN scenario. The calculations below are based on the highly conversative scenario of half the vehicles arriving in an hour period. The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The mean value of Sound Exposure Level for a light vehicle at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 68 dB L_{AX} at a distance of 10 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. The Sound Exposure Level can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 20\log_{10}(r_1/r_2)dB$$

where:

$L_{Aeq,T}$	is the equivalent continuous sound level over the time period T (in seconds);
L_{AX}	is the "A-weighted" Sound Exposure Level of the event considered(dB);
N	is the number of events over the course of time period T;
r_1	is the distance at which LAX is expressed;
r_2	is the distance to the assessment location.

It is assumed that up to 1,720 movements may occur in any 1 hour period. Using the equation detailed above along the proposed new access road, the predicted noise levels due to the access road is

65 dB $L_{Aeq,1hr}$ at 10m distance. NSL09 at 10m distance is the closest NSL to this proposed access. Reference to the attended noise measurements (AN3) indicate that the predicted noise levels below the existing traffic levels along the R680.

The cumulative operational traffic impacts are ***neutral*** to ***negative, imperceptible*** to ***not significant***, and ***long term.***

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10.5.2.6 Summary of Operational Effects

In terms of noise associated with day to day activities the associated effect is stated to be ***negative, imperceptible*** to ***slight-to-moderate*** and ***long-term.***

There is no source of vibration associated with the day to day operation of the development that will give rise to impacts at nearby noise sensitive locations. In terms of these the operational vibration effects of the proposed development the associated effects are ***neutral, imperceptible*** and ***long-term.***

10.6 Mitigation Measures

In order to sufficiently mitigate the likely noise impact, a schedule of noise control measures has been formulated for both construction and operational phases associated with the Proposed Development.

10.6.1 Construction Phase

With regard to construction activities, reference will be made to BS5228 Parts 1 and 2, which offer detailed guidance on the control of noise and vibration from demolition and construction activities. Various mitigation measures will be applied during the construction of the Proposed Development. It is specifically recommended that during any excavation and piling works that these mitigation measures are employed when work occurs within 20m of the closest NSL and during general site works which occur within 35m of the closest NSL.

Specific examples of such measures are:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration;
- Monitoring levels of noise and/or vibration during critical periods and at sensitive locations; and
- All site access roads will be kept even so as to mitigate the potential for vibration from lorries.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around items such as generators or high duty compressors; and
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

It is recommended that during piling works, vibration from construction activities to off-site NSLs be limited to the values set out in Table 10.4 through monitoring of vibration at the site boundary or at noise-sensitive locations. It should be noted that these limits in Table 10.4 are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%, as stated in BS5228.

10.6.2 Operational Phase

10.6.2.1 Power Plants / Building Services Noise / Emergency Site Operation

Noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in-line acoustic attenuators or 'silencers' for stacks and exhausts where necessary. With due consideration as part of the detailed design process, this approach will result in the site operating within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.

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10.6.2.2 Additional Vehicular Traffic on Public Roads

During the operational phase of the development, noise mitigation measures with respect to the effect of traffic due the development are not deemed necessary.

10.7 Monitoring or Reinstatement Measures

10.7.1 Construction Phase

The following monitoring measures are required to be implemented at the site for the project to ensure that construction activities do not cause excessive nuisance to receptors in the vicinity of the site.

10.7.1.1 Noise Monitoring

During the construction phase, the appointed contractor will monitor noise at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise will be monitored in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017).

The selection of monitoring locations will be based on the closest NSLs to the proposed works which have the potential to exceed the CNT, e.g.:

- At NSL01 to the northwest of energy centre;
- At NSL06 to the west of the village centre;
- At NSL14 to the south of the warehouses;
- At NSL22 to the south of the solar farm; and
- At NSL23 to the southeast of the solar farm.

Any Noise Monitoring Terminal (NMT) (number and locations to be agreed post-consent with Local Authority), to be installed will have the following specifications (or similar approved):

- Logging of two concurrent periods, e.g., 15-minute & hourly.
- Daily automated Charge Injection Calibration (CIC).
- E-mail alert on threshold exceedance.
- E-mail alert on low battery and low memory.
- Remote access to measured data.
- Live display of noise levels.

In addition, it is recommended that spot-check noise measurements are conducted on a monthly basis. These spot checks can be organised to coincide with works that have the potential to generate high levels of noise on site in order to confirm the potential extent of effects.

A monthly noise-monitoring report should be prepared by the contractor. Reports should identify any exceedances above nominal limit values and attempts to clarify the causes. Where remedial measures are required and identifiable, these should also be clearly stated.

10.7.1.2 Vibration Monitoring

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Where the excavation works take place within 50m of vibration-sensitive locations (VSLs) e.g. as per the NSLs outlined in Section above vibration monitoring shall be installed, with the number and locations to be agreed with Local Authority.

Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with ISO 4866: 2010: *Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures.*

The mounting of the transducer to the vibrating structure will need to comply with BS ISO 5348: 2021: *Mechanical vibration and shock – Mechanical mounting of accelerometers.*

In summary, the following ideal mounting conditions apply:

- The transducer and its mountings should be as rigid as possible;
- The mounting surfaces should be as clean and flat as possible;
- Simple symmetric mountings are best;
- The mass of the mounting should be small in comparison to that of the structure under test;
- The monitoring equipment should be set to monitor vibration in 5-minute periods;
- E-mail alert on threshold exceedance;
- E-mail alert on low battery and low memory;
- Remote access to measured data;
- Live display of vibration levels.

In addition, it is recommended that spot-check vibration measurements are conducted on a monthly basis. These spot checks can be organised to coincide with works that have potential to generate high levels of vibration on site in order to confirm the potential extent of effects.

A monthly vibration monitoring report should be prepared by the contractor. Reports should identify any exceedances above nominal limit values and attempts to clarify the causes. Where remedial measures are required and identifiable, these should also be clearly stated.

10.7.2 Operational Phase

If required by the planning conditions, noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the operation noise criterion. Noise monitoring should be conducted in accordance with the ISO 1996.

10.8 Residual Effects of the Proposed Development

This section summarises the likely noise and vibration impact associated with the Proposed Development, taking into account the mitigation measures.

10.8.1 Construction Phase

During the construction phase of Proposed Development there will be some impact on nearby noise sensitive properties due to noise emissions from site traffic and other activities. The application of noise limits and hours of operation (i.e. as per Table 10.1, Table 10.4 and Section 10.2.2), along with implementation of appropriate noise and vibration control measures (as summarised in Section 10.6.1), will ensure that noise and vibration impact is kept to a minimum. Also it is reiterated that any residual construction noise effects will be ***negative not significant*** and ***short term*** in nature.

10.8.2 Operational Phase

10.8.2.1 Building Services Noise / Emergency Site Operation

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Proprietary noise and vibration control measures have been employed including plant selection and acoustic screening, in order to ensure that noise emissions from building services plant do not exceed the adopted criterion at the façade of any nearby noise sensitive locations. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. The resultant noise effect is ***negative, slight*** to ***moderate*** and ***long-term.***

10.8.2.2 Additional Vehicular Traffic on Public Roads

In terms of the additional construction traffic on local roads that will be generated as a result of the proposed development, the following comment is presented: As stated in the DMRB Noise and Vibration (UKHE 2020), Volume 11, Section 3, Part 7, in order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the operation of the development, as outlined in the relevant sections of the Material Assets: Traffic and Transport Chapter, will not result in a significant noise impact.

The effects at noise-sensitive locations of operation traffic are therefore ***neutral, imperceptible*** and ***short-term.***

10.9 Cumulative Impacts of the Proposed Development

A set of third-party developments is considered here for potential cumulative noise and vibration effects.

10.9.1 Construction Phase

It is not anticipated that there will be any other construction activities that would give rise to significant cumulative impacts during the construction phase. With the implementation of mitigation measures described in Section 10.6.1, the predicted construction noise emissions for the proposed development are not of enough magnitude to cause an increase in the cumulative construction noise emissions exceeding the threshold for significant impacts at any NSL.

10.9.2 Operational Phase

Based on Table 2.1 in Chapter 2, the following development have been considered in this assessment

- WCC Reg. Ref 21214: Residential Development
- WCC Reg. Ref 22507: Residential Development
- WCC Reg. Ref 16/309: Solar Farm (west of subject lands)
- WCC Reg. Ref 16737: Solar Farm (south of subject lands)
- WCC Reg. Ref 1932 (amendment of Reg. Ref 16737): Solar Farm

Given the nature of these developments, it is not expected that any significant cumulative impact arise.

10.10 References

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (2022)
- Environmental Protection Agencies Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (2016);
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1 – Noise (2014);

- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration (2014);
- BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration (1993);
- BS 6472: Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz) (1992);
- ISO 9613: Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation. (2024);
- BS 4142: 2014+A1:2019: Methods for Rating and Assessing Industrial and Commercial Sound (2019);
- United Kingdom Highways England (now National Highways) (UKHE) Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UKHE, 2020), and;
- ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels (2017).

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Chapter 11 – Landscape and Visual Impact

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11. LANDSCAPE AND VISUAL IMPACT

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11.1 Introduction

This chapter should be read in conjunction with the site layout plans for the proposed development and the proposed overall masterplan and project description provided in Chapter 2. The purpose of this chapter is to analyse the existing landscape and to assess the likely potential visual impacts arising from the proposed development and overall masterplan on the existing landscape and any mitigation measures proposed.

11.2 Methodology

The criteria as set out in the current EPA Guidelines on Information to be contained in Environmental Impact Assessment Reports (Published May 2022) are used in the assessment of the likely impacts. Chapter 1 of this EIAR sets out the methodology used in the assessment in detail.

The assessment was carried out by visiting the site and its surroundings in October 2024 and by analysis of the relevant documents as listed below:

- Waterford County Development Plan 2022-2028
- Site Visit in October 2024
- Arborists Report and Drawings by Charles McCorkell Arboricultural Consultancy Ltd.
- Assessment of the accurately surveyed and modelled photomontages of the proposed development
- Current and historic aerial photographs,
- Historic maps of the site and surrounds using the Ordnance Survey Ireland's National Historic Maps Archive

Through analysis of the above, the subject lands were assessed in relation to their surrounding environment to identify a study area in which both visual and landscape character impacts would be perceivable. Important landscape features on subject lands and in the wider area were identified as part of this process.

The proposed viewpoints for the verified views were selected to represent points in the local landscape from which the development would potentially be visible and relate to views from potential visual receptors. Various viewpoints have been selected to provide a well-rounded and realistic representation of how the development will look from different aspects and demonstrate views from sensitive receptors. Views are located, North, South, East and West of the subject lands, both at close-range and long-range, and have been selected from specific locations where more expansive views are possible.

The buildings roads and landscape are modelled in three-dimensional AutoCAD software by the CGI consultant (Digital Dimensions Ltd). Two-dimensional AutoCAD drawings are provided by the design team for the CGI consultant to accurately model the external parts of the development. Liaison between the CGI consultant and the project Architect, Engineer and Landscape Architect on their respective designs informs the final appearance of the verified views. For details on methodology in relation to the surveying of photo view locations, lenses and specifics on the development of the verified views, refer to the accompanying Appendix completed by Digital Dimensions Ltd. (Appendix 11.1.)

11.2.1 Forecasting Methods and Difficulties Encountered

The wide visual envelope of the higher points on the subject lands presented some difficulties in regards to selecting viewpoints. Most of the subject lands are not visible in the wider landscape due to surrounding vegetation and local topography, however the high point in the site is visible from many directions and a

range of distances. Many of these viewpoints in the local landscape are from private lands and presented problems in regard to access, so assessing the visibility became an issue.

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The extent of existing ponds and wetlands on site were also hard to assess. During our site visit in October 2024, we noted a pond and wetland. Similarly, in the Waterford County Development Plan a pond and a wetland are included in the Biodiversity Assets Appendix. However, when assessing using aerial photography through Google Earth, it appeared that the extent of water on site was much wider and covered a large area in the south. This caused some ambiguity, however on discussion with the Project Ecologist we came to the conclusion that the aerial photography was outdated and most likely represented a period of very heavy precipitation in which the land temporarily flooded.

11.2.2 Assessment of Landscape and Visual Effects

The GLVIA 3rd Edition (Landscape Inst. + IEMA 2013) gives specific guidelines for landscape and visual impact assessment. The GLVIA advises that effects on views and visual amenity be assessed separately from the effects on landscape, however acknowledging the two topics are fundamentally linked.

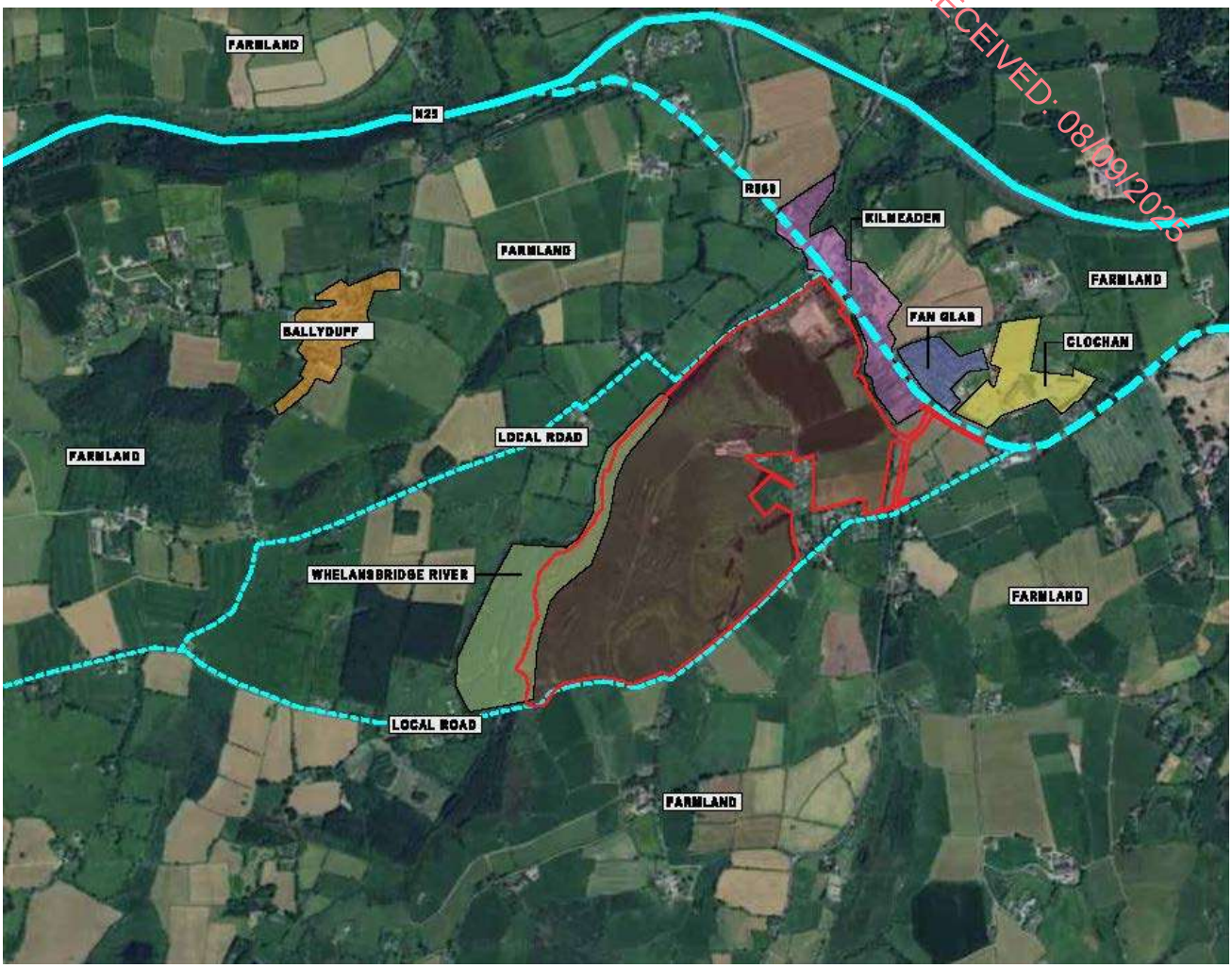
'Landscape' results from the interaction of the physical, social, and natural components of our surroundings. How these elements interact creates the intrinsic landscape character of a place. Landscape impact assessment identifies the changes to this character which would result from the proposed development and assesses the significance of those effects on the landscape. Visual impact assessment is concerned with changes that arise in the composition of available views (primarily public views), the response of people to these changes and the overall effects on visual amenity.

11.3 Receiving Environment

11.3.1 Site Area Context

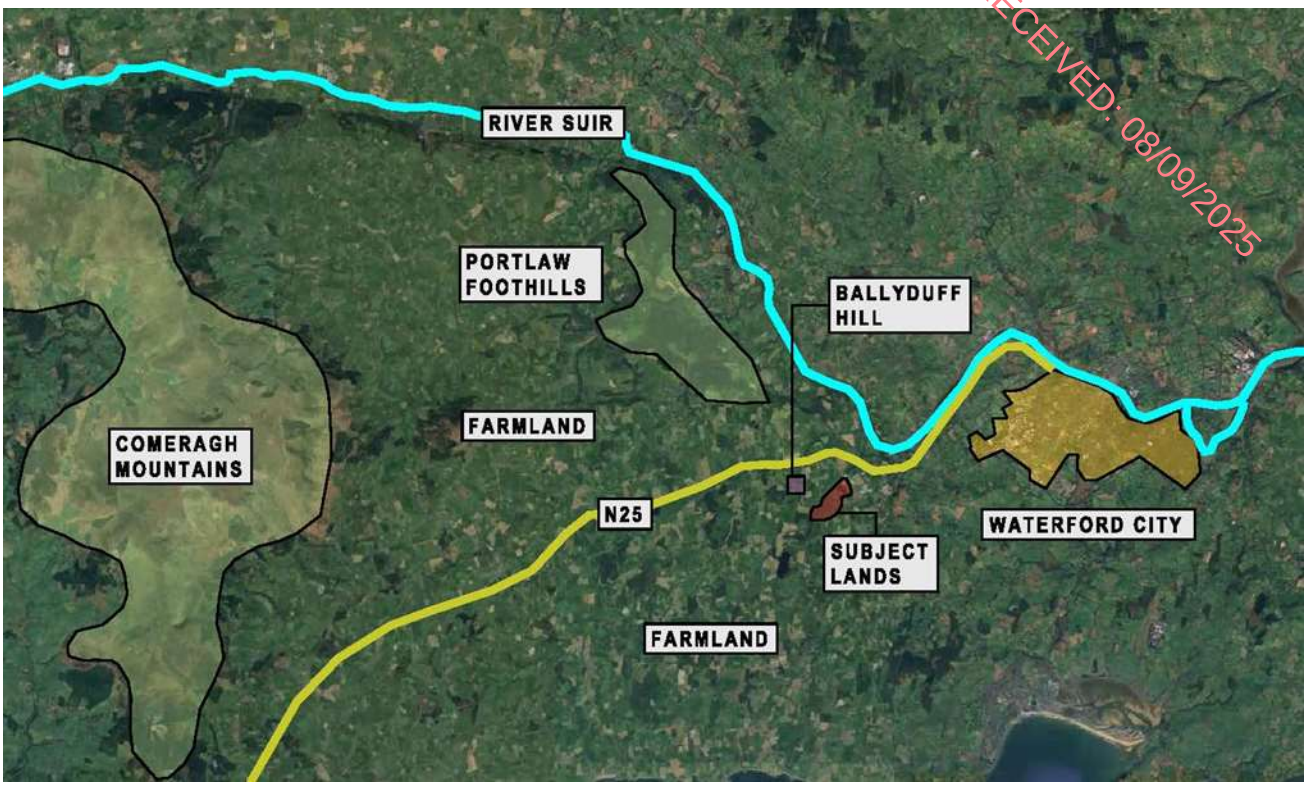
The subject lands are located in the small village of Kilmeaden, which sits approximately 10km west of Waterford City. The lands are located to the south-west of the regional road R680, which forms the main transitory route through the village of Kilmeaden. It's bordered to the north, south and east by local roads and laneways, while to the west, the boundary is formed by a large tree belt and stream. The surrounding landscape is agricultural, being used for both pastoral and arable farming and with hedgerow field boundaries typical of a traditional Irish agricultural landscape. The most built-up part of the local landscape is Kilmeaden Village and it's extents. The commercial part of the village is small and consists of a cluster of local shops and commercial and industrial units which are located to the north and east of the subject lands along the R680. The village has seen some expansion in recent years with the construction of housing developments in the southern part of the village such as Clochan and Fan Glas. There is also some scattered residential development along the R680 and local laneways which bound the subject lands. Adamstown Water Treatment Station and the Waterford City Bypass or N25 are located to the north-east of the site.

Figure 11.1 Site Context



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Figure 11.2 Site Context in the Wider Landscape



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In the wider landscape, the River Suir is located to the north, while to the north-west there are the Portlaw Foothills designated as landscape type 5G in the Waterford Landscape Character Assessment. To the south, land is mostly agricultural, with Gaulstown Dolmen being a visually and archaeologically important feature in the local landscape. Waterford City is located to the east. Ballyduff Hill, approximately a kilometre to the east offers expansive views of the local landscape, while the Comeragh Mountains would be the dominant landscape feature, on a larger scale, to the west, located approximately 20km from Kilmeaden.

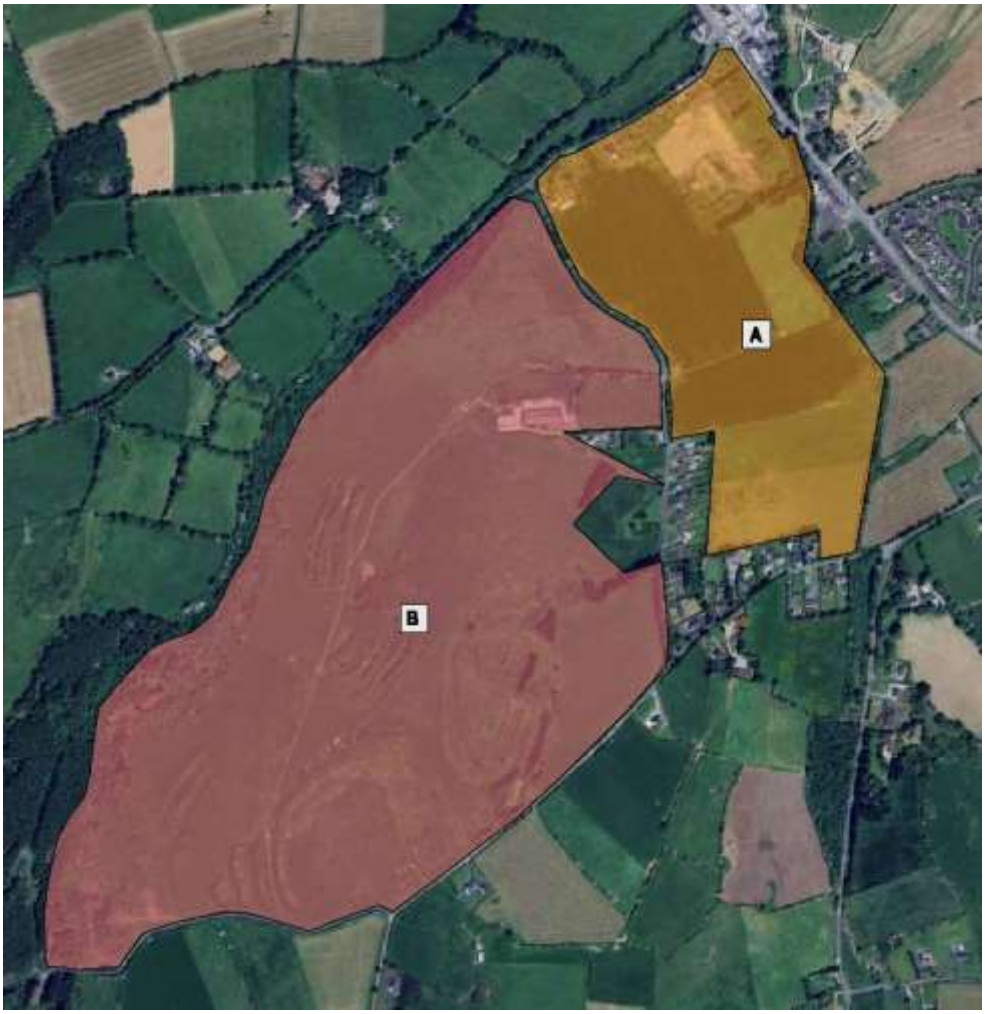
11.3.2 Site Area Description

The site measures approximately 1.9km on its longest east to west axis and approximately 800m on its longest north to south axis. It is divided into two parts by a road which runs north to south through the site. The shape of the site is irregular, being predominantly formed by boundaries between local houses, farm buildings and fields. The topography of the site varies greatly with the highest point in the site located at the top of Blackknock hill in the centre of the site, from here the levels fall away in all directions, making this the most visible point in the local landscape. The lowest part of the site is located along the northern site boundary where the site borders Kilmeaden Village.

Due to the size and varied landscape features of the site, it will be split into two sections for the purposes of assessing the receiving environment; Sections A and B, as shown in the below Figure 11.3 below.

Figure 11.3 Section A and B of Study Area

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Section A

This part of the site is located in between the local road that traverses the site and Kilmeaden and in parts fronts on to the village of Kilmeaden. The northern site boundary is formed, in part, by various structural boundaries which separate the public footpath along the R680 from the subject lands. In the northern corner of the site, opposite Country Life Garden Centre, the boundary is formed by a low timber crash barrier. This transitions to a low concrete wall, which in turn transitions to a low stone wall and wire mesh fencing. Both boundaries are located opposite the Centra Store. The mesh fencing continues along the road and around the Kilmeaden Healthcare Clinic, where the boundary is reinforced by mature laurel hedging. The fencing continues along the northern boundary to the back of local commercial units, adjacent carpark and Kilmeaden Playground. This section of the site boundary is defined by an existing stream and flood area with belt of dense tree vegetation with mixed species including Alder, Birch, Monterrey Pine, Poplar, Sycamore and Willow. The stream and streamside vegetation continue southwards along the eastern boundary, to the back of the village houses fronting on to the R680, until the site boundary extends out in a long leg to meet the R680, where it branches in both directions along the main road for a short distance. The roadside treatment in this location is a low scrubby hedgerow and meadow verge. The remainder of the western boundary is formed by an existing native hedgerow and emergent trees which separate the site from neighbouring arable land to the east. The southern boundary of Section A is formed by a mix of roadside hedgerow and rear garden boundary vegetation. The western side of Section A runs along the road which traverses the site. The northern boundary is defined by existing garden vegetation and boundaries to the rear of the existing houses and farmyards to the north.

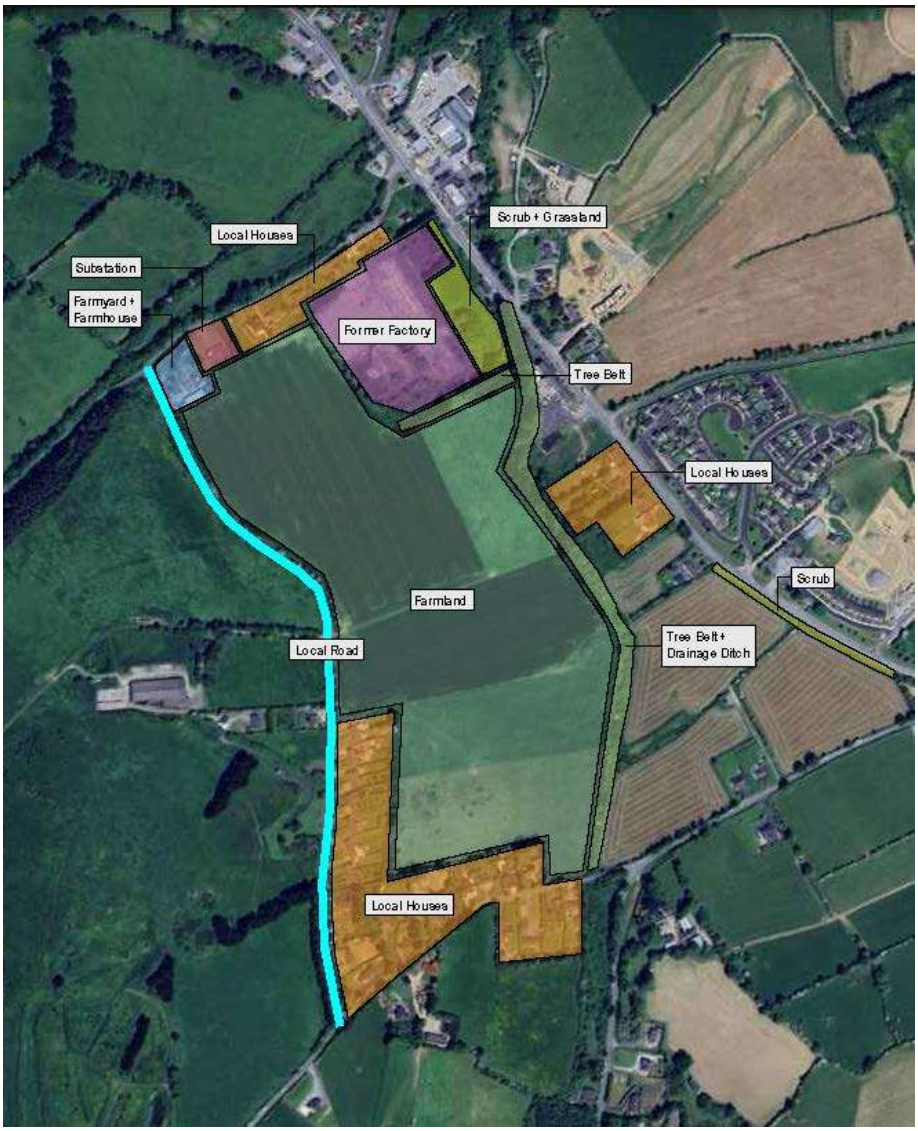
There are a number of landscape features within Section A of the subject lands. The area is predominantly used for agriculture, both arable and pastoral, and is separated into various fields. The north-eastern corner of the area, the part of the site closest to Kilmeaden, is the site of a former cheese factory, which has now been demolished. The remnants of the factory continue on the site in the form a concrete base, rubble from the demolition, derelict ancillary buildings and plant and an adjacent car park with an asphalt surface. The whole area has been disused for a considerable amount of time and scrub vegetation has taken over. A wide meadow verge separates the area from the R680 and a line of mature Poplar trees define the area from the south.

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The levels in Section A are the lowest throughout the site. Levels fall by 20m, at a gradient of approximately 1:18, west to east from Blackk

nock to the stream which runs along the eastern boundary at +16m. The site of the former cheese factory sits approximately 4m above the level of the R680 in the centre of Kilmeaden.

Figure 11.4 Study Area Section A – Existing Landscape Features



Section B

This part of the site is predominantly defined by Blackknock Hill and its surrounding topographical and landscape features. The northern site boundary is formed by the Whelansbridge River and a long tree and

scrub group which extends southwards along the western boundary to form a border between the subject lands and surrounding farmland to the west. The tree species here are of mixed variety, including Alder, Ash, Blackthorn, Hawthorn, Hazel, Syacmore and Willow. The southern boundary is formed by the roadside vegetation along the local laneway which connects Kilmeaden and farmland to the west. This is formed mainly by low hedgerows and scrub, along with some scattered tree groups. The local road which runs through the site is located to the east of Section B, along with a number of local dwellings.

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The main features within this part of the site are a farmyard, open grassland with tracks and laneways associated with the agricultural history of the site, commercial forestry, ponds, tree groups and scrub planting. The farm building is located beside and accessed via the road which traverses the site. There are two tree lined laneways (Griselinia and Sycamore trees) which lead westward to the shed which is located on the northern slope of Blackk

nock hill and offers expansive views of the local landscape. The farmyard contains a large shed along with outbuildings, overgound and underground effluent tanks, paddocks and concrete silage pits. There are a number of tracks traversing the lands, some stone and other mown grass, which historically would have been used to move around and manage the various paddocks within the overall parcel of land and the ponds associated with the cheese factory. This is apparent by the presence of agricultural electrified fencing which runs parallel to many of the tracks.

Visible from the farmyard is a small area of commercial forestry, planted predominantly with Sitka Spruce, along with some native species including Ash and Hazel. This is located inside the northern boundary with the local laneway to the north of the site. There are also various scrub groups scattered throughout the subject lands, mostly located on banks and where topography locally mounds up. Scrub groups are made up of Bramble, Blackthorn, Hawthorn Whin and Willow. Tree groups also exist through this part of the site, with large groups of Pines to be found south of the farmyard, on the southern slopes of the hill.

A series of constructed wetlands, including ponds, can be found on the subject lands, all of which are accessible by the existing tracks through the landscape. The ponds on the site are man-made and were constructed to treat the waste-water from the former cheese factory on the site. These ponds have predominantly dried out since the closure of the factory and are now home to willow scrub and wet grassland. Two of the ponds continue to have a permanent water level. The first of these ponds is located south-west of Blackknock Hill and contains a mix of rushes, grasses and sedges.

Figure 11.5 Study Area Section B – Existing Landscape Features



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11.3.3 Character of the Site

The landscape character of the study site and its environs has largely been determined by the following:

- localised steep and varying topography on the site and its surrounding environs within a larger geographical area of lowlands
- narrow rural laneways lined with hedgerow field boundaries and tree groups
- scattered rural residential settlement on the outskirts of Kilmeaden Village and local laneways
- new residential developments recently built and currently under construction in Kilmeaden
- landscape history of use as a cheese factory with remnants of the development remaining in the north of the site including non-native tree groups and hedges

- landscape history of agricultural use with grassland, tillage crops and traditional hedgerow field boundaries in the majority of the subject lands
- farmyard and ancillary structures in the centre of the site
- small section of commercial forestry in the north of the subject lands
- existing stream and streamside vegetation running along the eastern site boundary
- existing river and riverside vegetation running along the northern and western site boundaries
- scrub and tree groups scattered across the site
- existing ponds with riparian and scrub edges throughout the agricultural landscape in the western half of the site with historical use of water treatment

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Furthermore there would be considered to be a range of landscape characters present on the subject lands. The majority of the lands have an 'agricultural landscape character', with a large parcel of land divided into various agricultural fields used both as pasture and for tillage and hedgerow field boundaries. In the northern section of the site the landscape character would considered a 'transitional landscape', where the site of the demolished cheese factory, which had an 'industrial character', is now home to native scrub, colonising plants and emergent trees and in a state of disuse. A small area along the northern site boundary, to the north of the farmyard has a landscape character of 'commercial forestry', while there are groups of both 'native and naturalised woodland' and 'native scrubland' throughout the site.

Kilmeaden has a landscape character of a 'rural village', while the land around the site would have an agricultural landscape character with scattered residential development.

11.3.4 Landscape Sensitivity and Planning

Within the Waterford Landscape Character Assessment, the subject lands fall under the Landscape Character Type 2B Kilmacthomas Lowlands, where it is considered, according to '*Table 2 Sensitivity areas and classification'*, as having a low sensitivity to new development. Areas of low sensitivity are defined within the LCA as having *'the potential to absorb a wide range of new developments subject to normal planning and development control procedures.'*

Kilmeaden Village is listed in the Zoning Maps as being a settlement type 2B Rural Village, while the site of the former factory is considered a 'Regeneration and Opportunity Site'. There is a Specific Objective Development on the subject lands *'to facilitate and encourage the development of new industrial/ enterprise/ employment uses on this site which do not detract from the amenity of the existing village. The lands shall be primarily developed for industrial /employment uses and limited consideration may be given to residential development on the lands fronting onto the R680 Road. The Council shall seek the provision of a new focal point to the village centre and enhancement of the visual appearance of the Main Street. Particular regard to be had to the visual impact when viewed from the R680, permeability through the site and its relationship with the existing village core. A streetscape shall be created along the north-eastern boundary. Any industrial units shall be of a high standard design and finish and any layout shall have due regard to non –compatible adjoining land uses.'*

The land is not located within or adjoining any Natura 2000 designated sites or nationally designated NHA or pHNA. There are no Tree Preservation Orders, listed views or prospects, however there are two natural heritage assets on the subject lands, which can be found in '*Appendix 11: Natural Heritage Assets'* and for clarity are listed below:

- WD100 Blackknock Pond
- WD195 Blackknock Wet Woodland

According to *'Appendix 22: Archaeology'*, there are also two ringforts on the subject lands, as listed:

- WA016-033 Blackknock Ringfort – unclassified
- WA016-034 Blackknock Ringfort – unclassified

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There are a number of specific planning objectives which apply to the subject lands and its environs and are related to Landscape Character and Visual Impact:

Objective DO1: *It is an objective of the Council to facilitate and encourage the development of new industrial/ enterprise/ employment uses on this site which do not detract from the amenity of the existing village. The lands shall be primarily developed for industrial/employment uses and limited consideration may be given to residential development on the lands fronting onto the R680 Road. The Council shall seek the provision of a new focal point to the village center and enhancement of the visual appearance of the Main Street. Particular regard to be had to the visual impact when viewed from the R680, permeability through the site and its relationship with the existing village core. A streetscape shall be created along the north-eastern boundary. Any industrial units shall be of a high standard design and finish and any layout shall have due regard to non-compatible adjoining land uses.*

Objective BD 16: *We will ensure that Waterford's floodplains, wetlands and watercourses are retained for their biodiversity and flood protection values and maintain good ecological status of wetlands and watercourses in support of the provisions of the Water Framework Directive and Ramsar Convention.*

Objective BD 17: *We will ensure that Waterford's floodplains, wetlands and watercourses are retained for their biodiversity and flood protection values and maintain good ecological status of wetlands and watercourses in support of the provisions of the Water Framework Directive and Ramsar Convention.*

Objective BD 21: *To protect hedgerows in all new developments, particularly species rich roadside and townland boundary hedgerows, such features should be incorporated into the open space provisions at the concept design stage. There will be a presumption against the removal of hedgerows however where their removal is unavoidable replacement planting shall involve establishment of new hedgerows with native species of local provenance and that support pollinating species.*

Additionally, there are several objectives that apply to the general environs of the site and new development which may occur on subject lands listed below:

Objective BD 18: *The preservation of riparian corridors is a requirement for the protection of aquatic habitats and facilitation of public access to waterways. Development proposals will be required to avoid culverting of river channels while maintaining a buffer zone of at least 15m between the development works and the top of the riverbank. We will consult with Inland Fisheries Ireland and LAWPRO on the establishment and protection of riparian habitats where appropriate.*

Objective BD 20: *To protect hedgerows in all new developments, particularly species rich roadside and townland boundary hedgerows, such features should be incorporated into the open space provisions at the concept design stage. There will be a presumption against the removal of hedgerows however where their removal is unavoidable replacement planting shall involve establishment of new hedgerows with native species of local provenance and that support pollinating species.*

Objective L02: *We will protect the landscape and natural assets of the County by ensuring that proposed developments do not detrimentally impact on the character, integrity, distinctiveness or scenic value of their area and ensuring that such proposals are not unduly visually obtrusive in the landscape, in particular, in or adjacent to the uplands, along river corridors, coastal or other distinctive landscape character units.*

With respect to the assessment of the appropriate planning documents in this chapter 11.3.4 and considering the landscape character and nature of the site, as set out in Sections 11.3.1, 11.3.2 and 11.3.3, the subject lands would be considered to have a low-medium landscape sensitivity based on the

criteria set out in Table 11.1 below. The site is a brownfield site with former industrial uses and is located in a landscape character type with low landscape sensitivity within the Waterford Landscape Character Assessment. The current 'transitional character' present on the lands would not be of any inherent landscape value and would have a low landscape sensitivity.

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Table 11.1 Categories of Landscape Sensitivity[1]

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness, and harmony. These attributes are recognised in landscape policy or designations. In such areas the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park).
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. These attributes are recognised in landscape policy or designations as being of national, regional, or county. In such areas the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty).
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change
Low	The character of the landscape is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and where the principal management objective is to facilitate change through development, repair, restoration, or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principal management objective for the area is to facilitate change in the landscape through development, repair, or restoration.

Table 11.2 Rating of Visually Sensitive Receptors[2]

Sensitivity	Visual Receptor
Very High	Designated views, viewpoints, and vistas. Areas containing protected views as outlined in Development Plans or landscape policies. Very highly aesthetic views and vistas.

[1] Developed by KFLA ltd for this study based on GLVIA (Guidelines for Landscape and Visual Impact Assessment) 3rd Edition (Landscape Inst. + IEMA 2013)

[2] Developed by KFLA ltd for this study based on Transport Infrastructure Ireland Publication, Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document, Document No. PE-ENV-01101

Sensitivity	Visual Receptor
High	Local residences and local facilities with a direct and prolonged view of the development. High quality views from public open spaces Non-designated views of distinctive or characteristic landscapes from general road network. Views to and from local ridges, hills, high-points, buildings of note. Views to and from sites of regional ecological and / or cultural interest.
Medium	Viewers with a moderate interest in their environment such as recreational travelers and less frequent users of recreational facilities, e.g. walkers along canal, users of any adjacent parks, Viewers within a landscape dominated by traffic. Visual condition of the landscape is degraded. Views to and from open spaces, local parks. Views from sports and recreational facilities. Views to and from sites of local ecological and / or cultural interest. Views from general community, schools, institutional buildings, and associated outdoor areas.
Low	Viewers with a passing interest in their surroundings or whose interest is not specifically focused on the landscape, e.g. workers. Viewers within an exclusively trafficked landscape (i.e. a major roadway or adjacent to one with no mitigation) Views of unremarkable landscapes from general road network. Views of unremarkable landscapes from residences where significant road infrastructure exists in the vicinity. Views to and from industrial/commercial landscapes of little or no cultural heritage antiquity or aesthetic merit.
Negligible	Views to and from degraded or abandoned urban or peri-urban landscapes or areas of dereliction with very low aesthetics value and little or no elements of interest. Views dominated by transportation and other infrastructure of no aesthetics merit.

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Table 11.3 Visual Receptors with Low Sensitivity

Receptor	Description
VR1	Farmyard located to east R680 to N25 roadway. A dense vegetated boundary exists for most of the boundary. Views of subject and surrounding lands limited.
VR2	Single bungalow located between R680 roundabout and Ballyduff East. Views from this location are limited due to garden and roadside vegetation.
VR3	Farmyard located between R680 roundabout and Ballyduff East. Views from this location are limited due to boundary and roadside vegetation and field boundary hedgerows.
VR5	1 bungalow and 1 two-storey house located side by side to south of R680. Subject lands are not visible from this location due to level of vegetation between receptor and site.
VR6	Group of commercial units located to south of R680. Majority of subject lands are not visible from this location due to level of vegetation between receptor and site. Existing dwelling, vegetation, fencing and picnic benches are visible in the northern corner of the site.

Receptor	Description
VR7	Large group of commercial units and shops directly to north of subject lands and R680. Majority of subject lands are not visible from this location due to level of vegetation between receptor and site. Existing dwelling, vegetation, fencing and picnic benches are visible in the northern corner of the site.
VR8	Group of 3 bungalows and adjacent farmyard along Adamstown Laneway. Views of subject lands are virtually non-existent.
VR9	Group of 4 bungalows and adjacent farmyard along Adamstown Laneway and north of R680. Views of subject lands are virtually non-existent.
VR11	2 bungalows along northern side of R680. Views of subject lands are very limited due to proximity to commercial developments in Kilmeaden, garden planting and existing vegetation to boundary. Of subject lands.
VR12	Group of commercial units, adjacent carpark and playground located between eastern site boundary and R680. Site boundary vegetation blocks most views of subject lands. Glimpsed views of Blackknock Hill are possible.
VR17	The Sweep Bar. Local bar and restaurant with car park. Views of the upper parts of the site are possible but roadside vegetation prevents any expansive views of the site
VR18	Industrial units on the outskirts of Kilmeaden. Roadside vegetation only allows glimpsed views of the site.
VR20	Farmyard located approximately 150m to the east of the site. Vegetation around the farmyard and roadside vegetation prevent any clear views of the subject lands.
VR21	Cluster of 5 houses, 4 two-storey and 1 bungalow located along the R681, to the south of the subject lands. Garden and roadside vegetation prevents views of the subject lands.
VR23	House and adjacent farmyard located along laneway directly to the south of the subject lands. Proximity to the subject lands increases sensitivity, however views are largely screened by garden and roadside vegetation and surrounding houses.
VR27	1 bungalow south of the subject lands along local laneway in the townland of Carrickadustara. Subject lands are not visible due to local topography and vegetation.
VR28	Cluster of 8 houses located to the south-west of the subject lands. Subject lands are not visible due to local topography and vegetation.
VR30	Cluster of sheds and farm buildings along laneway to north of the site. Subject lands are not visible due to local topography and vegetation.
VR31	1 house along laneway to north of the site. Subject lands are only partially visible due to local topography and vegetation.
VR33	2 bungalows and adjacent farmyard. Subject lands are substantially screened by garden and roadside vegetation. Blackknock Hill is visible from some points.

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Table 11.4 Visual Receptors with Medium Sensitivity

Receptor	Description
VR4	Cluster of 9 bungalows and two-storey houses along Lacken Road. Clear views of Blackknock and the higher parts of the subject lands. Former factory site not visible due to vegetation along R680 in Kilmeaden Village and site topography.
VR10	Single residence at the top of Adamstown Laneway. Blackknock Hill on subject lands is visible, along with rolling hills to the west.

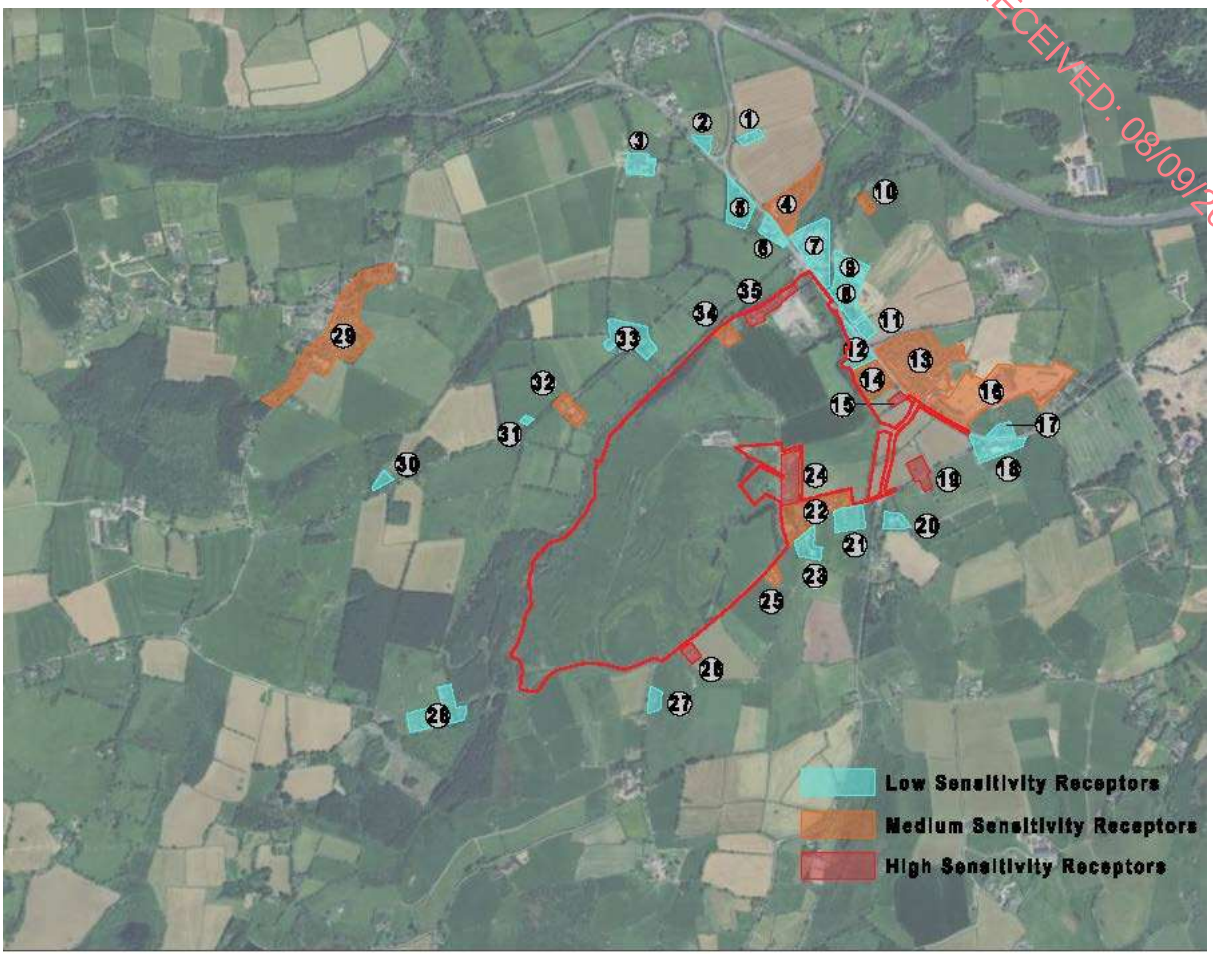
Receptor	Description
VR13	Fan Glas housing estate. Expansive views to the west are offered from the top of the estate, although the houses block the views partially, notably the lower parts of the subject lands. Only glimpsed views are offered from the lower parts of the housing estate.
VR14	Group of 5 dwellings, 3 bungalows and 2 two-storey houses located directly to the east of the subject lands and to the south of the R680.
VR16	Clochan housing estate. Expansive views to the west are offered from the top of the estate, although the houses block the views partially, notably the lower parts of the subject lands. Only glimpsed views are offered from the lower parts of the housing estate.
VR22	Line of 10 houses located along laneway directly to the south of the subject lands. Proximity to the subject lands increases sensitivity, however views are largely screened by garden and roadside vegetation.
VR25	1 two-storey house located along laneway directly to the south of the subject lands. Proximity to the subject lands increases sensitivity, however views are largely screened by garden and roadside vegetation.
VR29	Ballyduff Village and Ballyduff Hill. High point in the local landscape offering distant and expansive views. Subject lands are visible at various points along road through village, but distant views only are offered.
VR32	1 two-storey farmhouse and farmyard to the north of the subject lands. Subject lands are partially visible but screened by surrounding vegetation.
VR34	Farm house and farmyard which backs on to subject lands from the north. Proximity to the subject lands increases sensitivity, however views are largely screened by garden and roadside vegetation.

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Table 11.5 Visual Receptors with High Sensitivity

Receptor	Description
VR15	Single bungalow located directly to the east of the subject lands and to the south of the R680. Clear views of the upper and lower parts of the subject lands.
VR19	2 two-storey houses and 1 bungalow located approximately 170m to the east of the site with clear and expansive views of the subject lands
VR24	17 houses along laneway which traverses the site. These houses are directly opposite the subject lands and there are clear and expansive views of the site, particularly Blackk nock Hill. Towards the end of the row of houses, Kilmeaden Village and the lower parts of the subject lands are visible.
VR26	1 two-storey house located along laneway directly to the south of the subject lands. Clear and expansive views of the subject lands and distant mountain views.
VR35	Line of 5 houses, 3 bungalows and 2 two-storey, which back on to the subject lands from the laneway to the north of the site. Proximity to the subject lands increases sensitivity, however views are largely screened by garden and roadside vegetation. Clear and expansive views of the subject lands.

Figure 11.6 Map of Sensitive Visual Receptors around the Subject Lands



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11.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

11.4.1 Construction Phase

The change of use of the site from its current state to that of a construction site has the potential to result in the following impacts:

- Visual impacts due to the introduction of new structures, access roads, machinery, materials storage, associated earthworks, car parking, lighting and hoarding.
- Change of character due to the change in use.
- Visual impacts due change in ground levels and earthworks.
- Visual and landscape character impacts due to the removal of existing vegetation.

11.4.2 Operational Phase

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The proposed development has the potential to result in the following impacts:

- Visual impacts due to the introduction of new roads, parking, mechanical plant and lighting.
- Visual impacts due to the introduction of services and waste handling areas and litter.
- Change of character due to the change in use.
- Visual impact of landscape proposals – planting, lighting, hard surfaces etc.
- Visual impact due to the introduction of solar panels
- Landscape and visual impacts due to the removal of existing vegetation
- Landscape and visual impacts due to the installation of trees and vegetation

11.5 Potential Impacts of the Proposed Development

11.5.1 Construction Phase

11.5.1.1 Landscape Character

As described under section 11.4.1 above, the initial construction operations created by the clearance of the site and the construction of the buildings and roads will give rise to temporary or short-term impacts on the landscape character, through the introduction of new structures, machinery etc. and the removal of vegetation. The conversion of parts of the site from a greenfield landscape type to a building site is likely to be perceived in the ***short term*** as a ***significant, negative*** 'loss' of landscape character, particularly by sections of the local community closest to it.

The removal of existing vegetation will also cause a negative impact on the landscape character, however a large portion of the existing vegetation on the site is to be retained and incorporated into the landscape design.

With the above considered the ***negative*** visual impact on the landscape character during construction would be considered ***significant*** in magnitude. However, these impacts would only be ***short-term*** in duration. For the part of the site which will house the solar farm, the impact would also be ***negative*** but would be considered ***moderate*** and ***temporary*** in nature.

11.5.1.2 Visual

The introduction of the visual elements associated with the activities listed under section 11.4.1 will give rise to negative visual impacts for the users of the public realm and the sensitive visual receptors listed in Table 11.3, Table 11.4 and Table 11.5. Visual impacts during construction will affect all sensitive receptors identified with the magnitude of that effect changing over the course of the construction period.

The proposed development itself will mostly negatively impact sensitive visual receptors 4, 10, 13, 14, 15, 16, 19, 22, 24, 25, 34 and 35. The visual impact is likely to be ***significant*** however only ***short-term*** in duration.

11.5.2 Operational Phase

11.5.2.1 Landscape Character

The landscape character of the subject lands will be notably changed from its current largely undeveloped character to that of built environment. As described in Section 11.3 of this report, parts of the current landscape have the character of a traditional agricultural landscape that is common in the wider environment and some sections have a transitional character. Part of the site is a brownfield site which has a former industrial use. The existing wetlands on the subject lands were man-made and have an industrial origin as their function was for water treatment from the former factory. The lands are zoned

for this type of development, and it is unlikely that the land will remain as they are currently. Therefore, its current state is temporary.

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The proposed development includes a landscape scheme which prioritises the retention and enhancement of the hedgerows and tree belts around the perimeter and the creation of a network of landscape spaces which will become a publicly accessible park. This landscape scheme will improve local biodiversity, create visual screening and provide a range of high-quality amenity options to the local community. The buildings and landscape spaces in the 'Neighbourhood Centre' have been designed to provide a visually pleasing street frontage along the R680 through Kilmeaden and to be of a similar height to the existing commercial development in the village, which is located to the east of the site. The landscape proposals will cause a ***long-term, moderate, positive*** impact to Landscape Character.

The initial change to a new landscape that includes built development will cause a ***negative*** impact on landscape character. The impact would be considered ***medium-term*** and ***moderate***.

11.5.2.2 Visual

The extent of potential visual impact of the proposed development on the built environment has been shown from 13 representative view locations around the proposed development. This section assesses the views taking account of the integrated design mitigation measures, but without account of preventative and reduction mitigation measures. For a detailed description of each view, with an assessment of the residual effects of the proposed development, refer to Section 11.8.2.

The view locations are representative of locations from which it was suggested by mapping analysis and review in the field, that the proposed development might be visible. Photomontages from these locations are submitted as part of the application, as a separate A3 document by Digital Dimensions Ltd (Appendix 11.1 of this EIAR).

The proposed development **will not be visible** from the following locations: **View 10**

The proposed development **will be visible** from the locations listed in Table 11.6 below.

Table 11.6 Summary of Effects of the Proposed Development on Sensitive Visual Receptors during operation and before mitigation[3]

View	Relevant Receptors	Receptor Sensitivity	Quality	Significance	Probability	Duration
01	1 & 2	Low	Negative	Slight	Likely	Long-term
02	4 & 6	Low-Medium	Negative	Moderate	Likely	Long-term
03	4	Medium	Negative	Slight	Likely	Long-term
04	7	Low	Positive	Slight	Likely	Long-term
05	12	Low	Positive	Slight	Likely	Long-term
06	16	Medium	Negative	Significant	Likely	Long-term
07	19, 20 & 21	Low-High	Negative	Significant	Likely	Long-term
08	24	High	Negative	Moderate	Likely	Long-term
09	26 & 27	Low-High	Negative	Slight	Likely	Long-term
12	34	Medium	Negative	Moderate	Likely	Long-term
13	29	Medium	Negative	Slight	Likely	Long-term

[3] Assessment takes account of integrated design mitigation measures only

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11.6 Mitigation Measures

11.6.1 Construction Phase

11.6.1.1 Mitigation by Avoidance and Design

- Development of a construction management plan as an integral part of the design process, with control of construction activity, traffic, materials storage and lighting with due consideration for neighbouring residences and surrounding area
- A site planning design strategy to retain boundary hedgerows and tree protection measures was designed and implemented as part of the design process.

11.6.1.2 Mitigation by Prevention

- Site hoarding shall be erected to screen view of construction activity
- Tree protection measures will be installed to ensure vegetation to be retained is fully protected during the construction process

11.6.1.3 Mitigation by Reduction

- Monitoring of construction management plan and tree protection measures throughout the construction phase

11.6.2 Operational Phase

11.6.2.1 Mitigation by Avoidance and Design

- The architectural design of the building aims to reduce the visual mass through its form and choice of materials.
- The retention of existing native hedgerows will assist the visual integration of the building into the landscape and mitigate the visual impact.
- The landscape proposals include green links, trees, hedgerows, wetlands, SUDS features, woodland blocks and grassland and meadow. These elements will assist the visual integration of the building into the landscape and mitigate the visual impact.
- The inclusion of native coniferous tree species within the planting design will aid in the visual screening of the development throughout the whole year.

11.6.2.2 Mitigation by Prevention

- Creation of new hedgerows and tree belts in locations where they will aid visual integration of the scheme and reduce negative visual impacts.
- The retention of the existing landscape and exclusion zones around the solar panels will aid with their visual integration.

11.6.2.3 Mitigation by Reduction

- Periodic tree surveys and implementation of a tree management plan for the mature trees on site to ensure their continued sustainability.
- The implementation and monitoring of a landscape management plan for the full duration of the defects liability period to ensure successful establishment of the proposed planting scheme and trees.

11.7 Monitoring or Reinstatement Measures

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11.7.1 Construction Phase

Contracts will ensure good working practices to reduce any negative impacts arising from construction to the lowest possible level and to ensure that all machinery operates within clearly defined construction areas. Storage areas will be located to avoid impacting on sensitive views, trees, hedgerows, drainage patterns etc. and such areas will be fully re-instated prior to, and at the end of the construction contract. The works will also have continuous monitoring to ensure adequate protection of areas outside of the construction works. All tree protection measures will be monitored by a qualified Arborist throughout the construction period.

11.7.2 Operational Phase

A landscape management plan will form part of the works contract and include for ongoing maintenance of the planting scheme. A qualified landscape architect will monitor the post installation management and maintenance of the scheme by a suitable qualified landscape contractor. The landscape works and maintenance contracts will include a requirement for replacement planting to ensure the full design intent is realised.

11.8 Residual Effects of the Proposed Development

11.8.1 Construction Phase

The predicted residual effects will be as set out in section 11.5.1. The preventative and reduction mitigation measures listed will ensure the integrated design mitigation measures are successful. The integrated design mitigation measures are considered in the assessment section 11.5.1.

11.8.2 Operational Phase

The ameliorative mitigation measures, as listed in section 11.6.1, will reduce the effects of the Proposed Development on several of the listed visual receptors, as below:

Views 1, 3, 9, 11, 13 – The external design of the proposed solar panels reduces their visual impact. Exclusion zones to protect existing landscape features further reduces visual impact as much of the existing landscape will be retained.

Views 2, 4 and 5 – The architectural design of the proposed apartment buildings and neighbourhood centre is consistent with the typology of a small rural village and reduces their visual impact. The retention of the existing line of Poplar trees predominantly screens the apartment buildings, again reducing their impact. The landscape proposals create a positive visual impact in these views.

View 6 – The inclusion of a double-line of native trees along the R680, opposite Clochan housing estate reduces the visual impact of the proposed development and provides screening to an area with highly sensitive visual receptors where expansive views are offered over the site. Proposed native coniferous trees provide visual screening throughout the whole year. This mitigation measure reduces the negative impact from moderate to slight.

View 7 – The retention and enhancement of the existing landscape along with the landscape proposals as part of the park reduce the negative impact of this view. The retention of the existing hedgerow along the site boundary and a proposed hedgerow along the new road provide visual screening to the lower sections of the proposed buildings. Furthermore, the architectural design of the warehouse buildings reduces their negative visual impact from moderate to slight, with the building having a similar form to many farm buildings in the local landscape. The data halls cause a more negative visual impact.

The extent of the residual effects of the proposed development on the built environment has been shown from 13 representative view locations around the proposed development is assessed in the following section.

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The proposed development **will not be visible** from the following locations: **View 10**

The proposed development **will be visible** from the following locations:

Table 11.7 View 01 Residual Effects

View 01	648m from subject lands
Existing View: This is a medium-range view taken north of the subject lands along the R680 as it connects to the N25. Local visual receptors are VR1 and VR2 as referenced in Section 11.3.5. The subject lands are visible towards the south in this view. Blackknock Hill is visible in the centre background of the view, while the lower parts of the subject lands are hidden by the trees along the road. The foreground of the view is dominated by the R680 roadway and roadside vegetation.	
Proposed View Year 5: The solar panels located on the higher part of the subject lands are visible but do not cause a significant visual impact. The only proposals visible in this view are on the ground plane and create no more visual impact than many temporary agricultural practices (cover cropping, temporary seeding, tarping, lines of crops, etc.) would. The data hall buildings, structures and ancillary buildings associated with the energy centre are hidden due to local topography and existing trees and vegetation.	
Predicted Impact during construction	A significant and temporary negative impact
Predicted Impact during operation	A not significant and long-term negative impact

Table 11.8 View 02 Residual Effects

View 02	232m from subject lands
Existing View: This is a short-range view taken from the footpath opposite O'Donnacha's Bar, looking southwards towards the site. The viewpoint is located beside VR4 and VR6 as referenced in Section 11.3.5. The foreground of the view is dominated by the R680. The corner of the beer garden and carpark of the bar, Swift Oil Garage and a Gala shop are visible in the right middle ground of the view. In the left middle ground, trees on the subject lands are visible along with other trees in the local landscape and the R680 road leading into the distance. In the right background of the view, some of the existing trees on the subject lands can be seen.	
Proposed View Year 5: The proposed development is visible in the middle ground of this view. The most visually prominent elements of the development are the buildings in the 'Neighbourhood Centre' which front on to the main road and footpath through the village. The upper sections of the proposed data halls and energy centre are also visible in the right background of the view, along with the flues in the energy centre. The proposed development reads as a continuation of the existing commercial and industrial units located along Kilmeaden Village. It should be noted that the public realm and landscape proposals are also evident in this view, most clearly along the R680 and around the neighbourhood centre, creating a positive visual impact.	
Predicted impact during construction	A significant and short-term negative impact
Predicted Impact during operation	A slight and long-term negative impact

Table 11.9 View 03 Residual Effects

View 03	240m from subject lands
Existing View: This is a medium-range view taken from Lacka Road, close to VR4 as referenced in Section 11.3.5. The view looks southwards towards the site. The foreground of the view is dominated by the road, roadside vegetation and a local residence on the right hand side of the view. The subject lands are visible in the centre middle ground of the view. Blackknock Hill is the main part of the subject lands which is visible. The lower parts of the site are predominantly screened by existing trees and vegetation in the local landscape.	
Proposed View Year 5: The solar panels located on the higher part of the subject lands are visible but do not cause a significant visual impact. The only proposals visible in this view are on the ground plane and create no more visual impact than many temporary agricultural practices (cover cropping, temporary seeding, tarping, lines of crops, etc.) would. The data hall buildings, structures and ancillary buildings associated with the energy centre are hidden due to local topography and existing trees and vegetation.	
Predicted impact during construction	A significant and temporary negative impact
Predicted Impact during operation	A not significant and long-term negative impact

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Table 11.10 View 04 Residual Effects

View 04	66m from subject lands
Existing View: This is a short-range view taken directly north of the subject lands, along the footpath in Kilmeaden Village, looking southwards towards the site. The viewpoint is located beside VR7 as referenced in Section 11.3.5. The foreground of the view is dominated by the road and fencing associated with various commercial buildings in the village. The subject lands are visible in the centre middle ground of the view. The non-native conifers associated with the former cheese factory are the most dominant visual feature and form the visual ridgeline of the view. The trees along the eastern site boundary are also visible, along with a number of trees outside of the subject lands. A small mown grass area with an Oak tree, which fronts onto the footpath through the village and also forms part of the subject lands, is visible in the centre of the view.	
Proposed View Year 5: The proposed development is clearly visible in the middle ground of this view and alters the visual ridgeline. The removal of the existing line of Cypress trees to the north of the former cheese factory and other trees along the eastern site boundary is clear in the centre of the view. The most visually prominent elements of the proposed development are the buildings and car park associated with the neighbourhood centre which are visible in the middle ground of the view. In the background of the view, parts of the data halls and energy centre are also visible. It should be noted that the public realm and landscape proposals are also evident in this view, most clearly along the R680 and around the neighbourhood centre. The buildings in the neighbourhood centre have been designed to look consistent with their surroundings and fit well into a small rural village, appearing as a continuation of existing commercial units. Furthermore, the quantity of trees proposed is likely to create a significant positive impact in the long-term, eventually screening the more industrial style proposals further into the site and creating a high-quality streetscape through the village.	
Predicted impact during construction	A significant and short-term negative impact
Predicted Impact during operation	A moderate and long-term positive impact

Table 11.11 View 05 Residual Effects

View 05	53m from subject lands
Existing View: This is a short-range view taken to the east of the subject lands, along the footpath in Kilmeaden Village, looking west towards the site. The foreground of the view is dominated by the road and footpath through Kilmeaden. The Kilmeaden Health Clinic, VR12 as referenced in Section 11.3.5, is visible in the centre middle ground of the view, along with the Laurel hedging behind the building which is located close to the site boundary. In the background of the view, behind the Laurel hedge, many of the non-native conifers in the northern corner of the site are visible. The right hand side of the view is dominated by the R680 and footpath through the village and roadside vegetation.	
Proposed View Year 5: The proposed development is visible in the middle ground of this view. The removal of the existing line of Cypress trees to the north of the former cheese factory and other trees along the eastern site boundary is clear in the centre of the view. The most visually prominent elements of the proposed development are the buildings with the neighbourhood centre which are visible in the middle ground of the view. The proposed apartment blocks are largely screened by the existing Poplar trees along the footpath, and the architectural finish to the building is inconspicuous. The buildings in the neighbourhood centre can be seen fronting on to the road through the village. The buildings in the neighbourhood centre have been designed to look consistent with their surroundings and fit well into a small rural village, appearing as a continuation of existing commercial units. Furthermore, the quantity of trees proposed is likely to create a significant positive impact in the long-term, eventually screening the more industrial style proposals further into the site and creating a high-quality streetscape through the village.	
Predicted impact during construction	A significant and short-term negative impact
Predicted Impact during operation	A moderate and long-term positive impact

Table 11.12 View 06 Residual Effects

View 06	13m
Existing View: This is a short-range and expansive view over the subject lands and surrounding landscape. The view is taken to the east of the site, on the footpath outside the entrance to 'Clochan' housing development, referenced as VR16 in Section 11.3.5. The R680 and footpath are visible in the foreground of the view, along with grass verge associated with 'Clochan' housing development, on the right hand side. The middle ground of the view is dominated by the subject lands. Blackknock Hill and the existing houses to its east are visible in the left middle ground, while in the centre middle ground, the existing agricultural fields and hedgerow boundaries can be seen. In the background of the view, the existing trees in the northern corner of the site are visible, although they are not a prominent feature.	
Proposed View Year 5: The proposed development is only partially visible in this view. As part of the proposals, a dense belt of native tree planting has been proposed along this section of the R680 to provide visual screening to the development. Only the upper sections of the data halls and flues in the energy centre are visible in the background of the view.	
Predicted impact during construction	A significant and short-term negative impact
Predicted Impact during operation	A moderate and long-term negative impact

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Table 11.13 View 07 Residual Effects

View 07	61m from subject lands
Existing View: This is a short-range view of the subject lands taken to the east of the site, along local road R681 close to VR19, VR20 and VR21 as referenced in Section 11.3.5. Although views of the subject lands are possible, they are obstructed by boundary trees and vegetation, so the subject lands are not totally visible. The foreground of the view is dominated by the road, while the middle ground, and visual ridgeline, of the view are formed by the subject lands' eastern boundary hedgerow and trees. The fields and boundary hedgerows within the site are also visible behind the boundary. Glimpsed views of the local houses are possible thorugh the trees in the left middle ground.	
Proposed View Year 5: The proposed development is visible, but it is partially screened by both existing boundary vegetation and the proposed landscape berms. The most visually prominent parts of the built-development are the upper sections of the data halls, which are prominent on the right, and the warehouse on the left. The appearance of the warehouse building would be consistent with that of many agricultural buildings visible in the local landscape. The public park is to the forefront of this view with walking routes, a significant level of native tree planting, grassland and meadow and ponds and wetlands. The existing hedgerow retained along the site boundary and the hedgerow proposed to the back of the new road provide visual screening to the data halls, as do the landscape berms. The landscape proposals create a positive visual impact and reduce the overall negative impact of the development in this view.	
Predicted impact during construction	A significant and short-term negative impact
Predicted Impact during operation	A moderate and long-term negative impact

Table 11.14 View 08 Residual Effects

View 08	17.5m from subject lands
Existing View: This is a short-range view taken along the public road which traverses the subject lands. The viewpoint is located outside the last house in a row of houses to the south of the road, referenced as VR24 in Section 11.3.5, and looks north over the subject lands. The agricultural fields on the subject lands can be seen in the centre middle ground, while the trees along the eastern and northern site boundaries are visible, but not prominent. The foreground of the view is dominated by the road, roadside vegetation and garden walls, fencing and hedging. In the background of the view, a high point in the local landscape, located to the east of the village, is visible.	
Proposed View Year 5: The landscape berms effectively screen much of the development from this viewpoint. The upper sections of the data halls and buildings in the energy centre are visible in the background of the view.	
Predicted impact during construction	A significant and short-term negative impact
Predicted Impact during operation	A slight and long-term negative impact

Table 11.15 View 09 Residual Effects

View 09	19m from subject lands
Existing View:	

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View 09	19m from subject lands
This is a short-range view of the subject lands taken to the east of the site, along local road R681 close to VR26 and VR27, as referenced in Section 11.3.5. The existing boundary vegetation, a low-cut, scrubby hedgerow, and vegetation within the subject lands are visible in this view. The vegetation on this part of the subject lands is mostly dominated by scrub such as Gorse and Goat Willow. The foreground of the view is dominated by the road and roadside vegetation.	
Proposed View Year 5: The proposed development will not cause any noticeable visual intrusion in this view. Partial views of the proposed solar panels are visible in the background and outer edges of the views, but they are largely imperceptible. The only proposals visible in this view are on the ground plane and would have a similar visual impact to many temporary agricultural practices (cover cropping, temporary seeding, tarping, lines of crops, etc.) would The scrub vegetation visible in the existing view is to be retained as part of the landscape scheme and is visible in this view.	
Predicted impact during construction	A significant and temporary negative impact
Predicted Impact during operation	A not significant and long-term negative impact.

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Table 11.16 View 11 Residual Effects

View 11	165m from subject lands
Existing View: This is a medium-range view of the subject lands taken to the north of the site, along a local road close to VR33, as referenced in Section 11.3.5. The subject lands are partially visible with Blackknock Hill forming the visual ridgeline of the view, and the Sitka Spruce plantation along the northern site boundary being visible. The rest of the view is dominated by roadside vegetation.	
Proposed View Year 5: The proposed development will not cause any noticeable visual intrusion in this view. Partial views of the proposed solar panels are visible in the background and outer edges of the views, but they are largely imperceptible. The only proposals visible in this view are on the ground plane and create no more visual impact than many temporary agricultural practices (cover cropping, temporary seeding, tarping, lines of crops, etc.) would The scrub vegetation visible in the existing view is to be proposed and part of the landscape scheme and is visible.	
Predicted impact during construction	A significant and temporary negative impact
Predicted Impact during operation	A not significant and long-term negative impact.

Table 11.17 View 12 Residual Effects

View 12	83m from subject lands
Existing View: This is a short-range view of the subject lands taken to the north of the subject lands beside VR34, as referenced in Section 11.3.5. The foreground of the view is dominated by the road and roadside vegetation. An existing house and garden vegetation such as ornamental trees and hedging is visible in the centre middle ground of the view.	
Proposed View Year 5:	

View 12	83m from subject lands
This view looks towards the data halls and energy centre, the parts of the proposed development which cause the most visual impact. The viewpoint is taken from the public road to the north of the subject lands which, in parts, sits at a lower level than the site and the proposed FFLs and landscape levels. This causes the majority of the proposed development to be screened from view. The proposed flues are the only part of the development which are visible in this view.	
Predicted impact during construction	A moderate and short-term negative impact
Predicted Impact during operation	A slight and long-term negative impact

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Table 11.18 View 13 Residual Effects

View 13	1082m from subject lands
Existing View: This is a long-range view taken from Ballyduff Hill to the north-west of the subject lands. The viewpoint is located within VR29. The view is dominated by the car park opposite Ballyduff Church and the houses in Ballyduff Village in the foreground and middle ground of the view. In the background, the local agricultural landscape and rolling hills are visible.	
Proposed View Year 5: The proposed development will not cause any noticeable visual intrusion in this view. Partial views of the proposed solar panels are visible in the background and outer edges of the views, but they are largely imperceptible. The only proposals visible in this view are on the ground plane and create no more visual impact than many temporary agricultural practices (cover cropping, temporary seeding, tarping, lines of crops, etc.) would. The scrub vegetation visible in the existing view is to be proposed and part of the landscape scheme and is visible.	
Predicted impact during construction	A slight and short-term negative impact
Predicted Impact during operation	A not significant and long-term negative impact

Table 11.19 Summary of Residual Effects of the Proposed Development on Sensitive Visual Receptors[4]

View	Relevant Receptors	Receptor Sensitivity	Quality	Significance	Probability	Duration
01	1 & 2	Low	Negative	Not significant	Likely	Long-term
02	4 & 6	Low-Medium	Negative	Slight	Likely	Long-term
03	4	Medium	Negative	Not significant	Likely	Long-term
04	7	Low	Positive	Moderate	Likely	Long-term
05	12	Low	Positive	Moderate	Likely	Long-term
06	16	Medium	Negative	Moderate	Likely	Long-term
07	19, 20 & 21	Low-High	Negative	Moderate	Likely	Long-term

[4] After prevention and reduction mitigation measures

View	Relevant Receptors	Receptor Sensitivity	Quality	Significance	Probability	Duration
08	24	High	Negative	Slight	Likely	Long-term
09	26 & 27	Low-High	Negative	Not significant	Likely	Long-term
12	34	Medium	Negative	Slight	Likely	Long-term
13	29	Medium	Negative	Not significant	Likely	Long-term

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11.9 Cumulative Impacts of the Proposed Development

There are a number of permitted developments in the local landscape which share typologies with the proposed development. There are two permitted housing schemes, WCC Reg. Ref 21214 and WCC Reg. Ref 22507, to the east of the subject lands. Both are partially completed and are referenced in Section 11.3 as Fan Glas and Clochan. The developments consist mostly of detached, semi-detached and terraced housing, but also include apartment blocks.

A number of permitted Solar Farm schemes also exist in close proximity to the subject lands, one in the townland Loughdeheen, to the south of the subject lands, and the other in the townland of Amberhill, to the west of the subject lands.

Furthermore, the existing development in Kilmeaden Village includes a number of industrial and commercial units such as garages, shops, garden centres, storage yards, mixed-use commercial buildings and, in the more external parts of the village, agricultural buildings.

11.9.1 Construction Phase

The construction activities associated with the construction of the neighbourhood centre and residential part of the site will be of a similar scale, duration and typology as the permitted and partially constructed residential developments described above. Similarly, the construction of the solar farm element of the site will have the same impacts as the permitted solar farm schemes in the local landscape.

Furthermore, the activities carried out in local warehouses, agricultural buildings, garages, etc., although not as intrusive, would have a similar impact on landscape character and a similar visual impact as the construction activities which will be carried on the subject lands.

With the above considered, the impacts of the proposed development would not be out of place in the local landscape and the surrounding existing and permitted developments would decrease the impact on landscape character and visual impact of the proposed development.

11.9.2 Operational Phase

During operation, the visual impacts caused by the proposed development will predominantly be of a similar nature as to that of the existing and permitted developments mentioned above. The neighbourhood centre and apartment blocks have been designed to slot into the existing fabric of the village, both through form and finish. This part of the proposed development will therefore read as an extension of the existing residential and commercial development through Kilmeaden. Similarly, the more industrial parts of the proposed development, the data halls and energy centre, will appear as an extension of existing industrial units, warehouses and so on, that can be found in the village. The proposed development is however a larger scale development, and the initial impact will be negative and moderate. As the landscape scheme matures, the impact will reduce and the development will become much less prominent in the local landscape. The historical context of the site should also be considered, particularly the northern section of the site which was a factory and had an industrial use. Many remnants of the former factory still exist on

site in a state of dereliction, therefore the public realm proposals and landscape scheme will have a very positive impact on both landscape character and visual amenity.

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Chapter 12 – Archaeology, Architectural and Cultural Heritage

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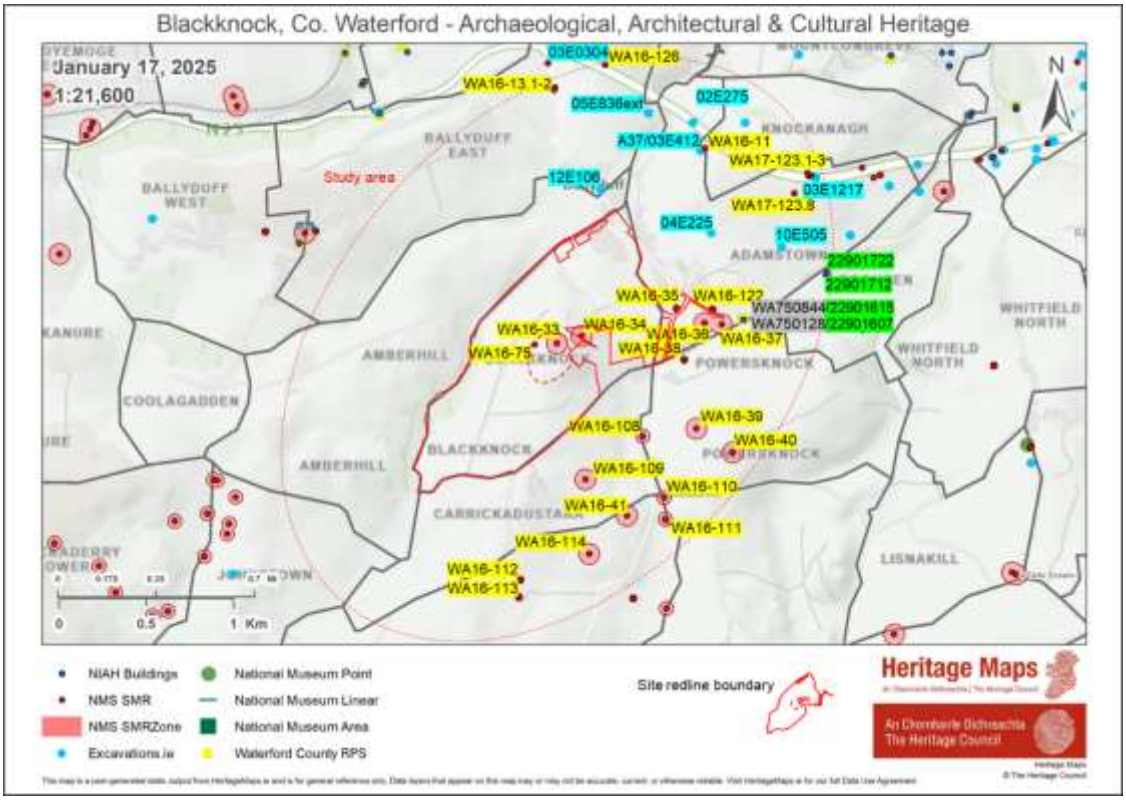
12. ARCHAEOLOGY, ARCHITECURAL AND CULTURAL HERITAGE

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12.1 Introduction

The following chapter assesses the predicted impacts of the Proposed Development on archaeological, architectural and cultural heritage. The Proposed Development is located in the townlands of Blackknock and Adamstown, Co. Waterford (ITM E. 651552m, N. 608589m; see Figure 12.1.

Figure 12.1 Site location map showing recorded archaeological and architectural heritage sites in the vicinity of the Proposed Development.



12.2 Methodology

12.2.1 Forecasting Methods and Difficulties Encountered

Archaeological, architectural and cultural heritage have been assessed in line with best practice at a National and EU level, in line with the following:

12.2.1.1 Guidelines and Legislation

The following legislation, standards and guidelines were consulted as part of the assessment:

- National Monuments Acts, 1930 to 2014;
- The Planning and Development Act, 2000 (as amended);
- Heritage Act, 1995 (as amended);
- Draft Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), 2015, EPA;
- Guidelines on the Information to be contained in Environmental Impact Assessment Report 2022, EPA;

- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht, and Islands; and
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Local Government (Planning and Development) Act 2000.

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12.2.1.2 The Valletta Convention

The Valletta Convention was adopted on 16 January 1992 in Valletta (Malta) and came into force on 25 May 1995 (Council of Europe Treaty Series no. 143). It is open for signature by member states of the Council of Europe and other states party to the European Cultural Convention and for accession by non-member states and the European Community.

The Valletta Convention (The European Convention for the Protection of the Archaeological Heritage (revised)) replaced and updated the original London Convention of 1969. It reflected the change in the nature of threats to the archaeological heritage, which now came less from unauthorised excavations, as in the 1960s, and more from the major construction projects carried out all over Europe from 1980 onwards. The revised Convention drew on twenty-two years of experience in implementing the original Convention. It established a body of new basic legal standards for Europe, to be met by national policies for the protection of archaeological assets as sources of scientific and documentary evidence, in line with the principles of integrated conservation.

No difficulties were encountered during the study.

12.2.2 Assessment Methodology

To set the Proposed Development within its wider archaeological, architectural and cultural heritage landscape, and to assess the potential of encountering such features on the site, a paper survey of archaeological, architectural heritage, historical and cartographic sources was undertaken. A study area of approximately 500m from the Proposed Development was assessed, with reference to important relevant findings farther afield.

12.2.2.1 Record of Monuments and Places

The Record of Monuments and Places (RMP), comprising the results of the Archaeological Survey of Ireland, is a statutory list of all recorded archaeological monuments known to the National Monuments Service (https://archaeology.ie). The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, the field notes of the Archaeological Survey of Ireland and other relevant publications. Sites recorded on the Record of Monuments and Places all receive statutory protection under the National Monuments Act 1994. The information contained within the RMP is derived from the earlier non-statutory Sites and Monuments Record (SMR); some entries, however, were not transferred to the statutory record as they refer to features that on inspection by the Archaeological Survey were found not to merit inclusion in that record or could not be located with sufficient accuracy to be included. Such sites however remain part of the SMR. The record is a dynamic one and is updated so as to take account of on-going research. The Record of Monuments and Places was consulted in the Archives of the Department of Arts, Heritage and the Gaeltacht. The recorded archaeological monuments located within the study area are detailed in see Appendix 12.1, listed in Table 12.1 and shown in Figure 12.1.

12.2.2.2 Recorded Archaeological Objects

The National Museum of Ireland's topographical files are a national archive of all known archaeological finds from Ireland. They relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The topographical files were consulted to determine if any archaeological artefacts had been recorded from the area. Other published catalogues of prehistoric material were also studied: Raftery (1983 - Iron Age antiquities), Eogan (1965; 1993; 1994 - bronze

swords, Bronze Age hoards and goldwork), Harbison (1968; 1969a; 1969b - bronze axes, halberds and daggers).

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12.2.2.3 Recorded Archaeological Excavations

The excavation bulletin website (https://excavations.ie) was consulted to identify previous excavations that have been carried out within the study area. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2023. There have been no previous licenced archaeological investigations within the study area as recorded on the excavation's website. Results of the recorded archaeological excavations in the study area are given in Appendix 12.2 (see also Table 12.2 and Figure 12.1).

12.2.2.4 Cartographic Sources

Down Survey - Taken in the years 1656-1658, the Down Survey of Ireland is the first ever detailed land survey on a national scale anywhere in the world. The survey, led by William Petty, sought to measure all the land to be forfeited by the Catholic Irish in order to facilitate its redistribution to Merchant Adventurers and English soldiers (https://downsurvey.tchpc.tcd.ie/). The county barony and parish maps as shown in Figures 12.2 – 12.4.

Ordnance Survey Early Editions - Reference to cartographic sources provides information on the development of the area. Manuscript maps consulted included the Ordnance Survey first edition 6" (1829-41), second edition 25" (1897-1913) and Cassini edition maps were assessed (https://heritagemaps.ie; see Figures 12.5 – 12.8).

12.2.2.5 Griffith's Valuation

Griffith's Valuation was the first full-scale valuation of property in Ireland, overseen by Richard Griffith and published between 1847 and 1864. It is one of the most important surviving 19th century genealogical sources (http://www.askaboutireland.ie/griffith-valuation/). The Griffiths Valuation is given in Figure 12.9.

12.2.2.6 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is a systematic programme of identification, classification and evaluation of the architectural heritage of the State (https://archaeology.ie; https://buildingsofireland.ie). The Minister for Housing, Local Government and Heritage is currently using the Inventory as the basis for making recommendations for the inclusion of structures in the Record of Protected Structures (RPS). No structures included in the NIAH are located within the footprint of the Proposed Development. The recorded sites recorded within the study area are detailed in Appendix 12.3, listed in Table 12.3 and shown in Figure 12.1.

12.2.2.7 National Census

The household returns and ancillary records for the censuses of Ireland of 1901 and 1911, which are in the custody of the National Archives of Ireland, represent an extremely valuable part of the Irish national heritage. All thirty-two counties for 1901 and 1911 are now available online (https://nationalarchives.ie/collections/search-the-census/). The 1901 and 1911 census records for Blackknock and Adamstown were examined.

12.2.2.8 The School's Collection

Dating from 1937-39, the School's Collection is a remarkable collection is the outcome of an innovative project supervised by the Irish Folklore Commission. In conjunction with the Department of Education and the Irish National Teachers' Organisation, senior Primary School children recorded in excess of 750,000 pages of local history and oral tradition from across the 26 counties of the Irish Free State. This includes

some 18,000 of the children's original school exercise books. This collection has been digitized and is now available at (https://www.duchas.ie/en; see Figure 12.10).

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12.2.2.9 Aerial Photography

Available online sources for aerial photography were consulted, including the Ordnance Survey and National Monuments Service collections, and Google Maps (see Figures 12.11 – 12.16).

12.2.2.10 Historical Research

The baseline historical research utilised sources including Lewis' Topographical Dictionary of Ireland (1837) and local journals.

12.2.2.11 County Development Plan

The Waterford Development Plan 2022 – 2028 was consulted (https://consult.waterfordcouncil.ie/en/consultation/waterford-city-county-development-plan-2022-%E2%80%93-2028). The plan includes policy objectives for the protection of the county's architectural heritage through their inclusion in the Record of Protected Structures (RPS) or in Architectural Conservation Areas (ACA). The RPS is a list of every structure which is of special architectural, archaeological, artistic, cultural, scientific, social or technical interest within the council's functional area (see Appendix 12.3, Table 12.3 and Figure 12.1).

12.2.2.12 Site Walkover Survey

A site walkover survey was undertaken on 16 January 2025 in sunny dry weather (see Figure 12.17 – Figure 12.44).

12.3 Receiving Environment

12.3.1 Introduction

The Proposed Development is located in the townlands of Blackknock and Adamstown, which are in the Electoral Division of Reisk, in the Civil Parish of Kilmeaden, in the Barony of Middlethird, in the County of Waterford.

Blackknock borders the following other townlands:

- Adamstown to the east
- Amberhill to the west
- Ballyduff East to the north
- Garrickadustara to the south
- Powersknock to the east

Adamstown borders the following other townlands:

- Ballyduff East to the west
- Blackknock to the west
- Dooneen to the east
- Garrickadustara to the south
- Kilmeaden to the north
- Knockanage to the east
- Mountcongreve to the north
- Powersknock to the south.

Table 12.1 Recorded archaeological sites and monuments within the study area (source: https://heritagemaps.ie; https://archaeology.ie).

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SMR No	Townland	Monument Class	ITM
WA016-011----	Knockanagh	Designed landscape - tree-ring	652265, 609664
WA016-033----	Blackknock	Ringfort - unclassified	651414, 608543
WA016-034----	Blackknock	Ringfort - unclassified	651556, 608585
WA016-035----	Adamstown	Ritual site - holy well	652101, 608744
WA016-036----	Adamstown	Castle - unclassified	652261, 608660
WA016-037----	Adamstown	Church	652361, 608652
WA016-038----	Powersknock	Standing stone	652146, 608449
WA016-039----	Powersknock	Ringfort - rath	652215, 608053
WA016-040----	Powersknock	Ringfort - unclassified	652424, 607916
WA016-041----	Raheens	Enclosure	651817, 607553
WA016-075----	Blackknock	Redundant record	651287, 608537
WA016-108----	Powersknock	Burnt mound	651907, 608010
WA016-109----	Carrickadustara	Souterrain	651578, 607761
WA016-110----	Loughdeheen	Burnt mound	652030, 607656
WA016-111----	Loughdeheen	Burnt mound	652037, 607533
WA016-112----	Raheens	Standing stone	651205, 607185
WA016-113----	Raheens	Standing stone	651196, 607085
WA016-114----	Raheens	Souterrain	651600, 607333
WA016-122----	Adamstown	Boundary stone	652308, 608738
WA016-126----	Ballyduff East	Excavation - miscellaneous	651690, 610143
WA016-130001-	Ballyduff East	Fulacht fia	651404, 610014
WA016-130002-	Ballyduff East	Fulacht fia	651399, 609999
WA017-123001-	Adamstown	Hut site	652861, 609503
WA017-123002-	Adamstown	Hut site	652873, 609508
WA017-123003-	Adamstown	Hut site	652854, 609521
WA017-123008-	Adamstown	Excavation - miscellaneous	652779, 609406

Table 12.2 Recorded archaeological excavations within the study area (source: https://heritagemaps.ie; https://excavations.ie)

Exc. #	Licence #	Site Name	Site type	SMR #
2002:1797	02E0275	Knockanagh 3	Excavation - miscellaneous	WA17-123.3
2003:1854	03E1217	Adamstown 3	House - prehistoric	N/A
2003:1899	03E0412	Knockanagh 1	No archaeology found	WA16-1

Exc. #	Licence #	Site Name	Site type	SMR #
2003:1917	03E0304	Newtown 1	Pit and Hearth	WA16-126
2004:1656	03E1217	Adamstown 3	Hut site	WA17-123.1–3
2004:1661	04E0225	Ballyduff East/Adamstown 43	Fulacht fia	WA16-130.1-2
2007:1827	A037; 03E0412	Knockanagh 1	Designed landscape - tree-ring	N/A
2009:800	05E0836ext	Ballyduff East	No archaeology found	WA16–116
2011:592	10E0505	Adamstown	Testing	N/A
2012:591	12E0106	Ballyduff/Kilmeaden	No archaeological significance	WA16-116

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Table 12.3 Recorded architectural heritage buildings in the study area (source: https://heritagemaps.ie; https://archaeology.ie; https://buildingsofireland.ie; https://consult.waterfordcouncil.ie/en/consultation/waterford-city-county-development-plan-2022-%E2%80%93-2028)

NIAH No.	RPS No.	Original Use	Townland	Date	ITM
22901615	WA750844	post box	Adamstown	1900 - 1910	652485, 608679
22901712	-	gate lodge	Dooneen	1840 - 1850	652959, 608939
22901722	-	gates/railings/walls	Dooneen	1840 - 1850	652967, 608952
22901607	WA750128	cottage	Adamstown	1860 - 1880	652490, 608690

Figure 12.2 Extract from the Down Survey map of the County Waterford



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Figure 12.3 Extract from the Down Survey map of the Barony of Middlethird

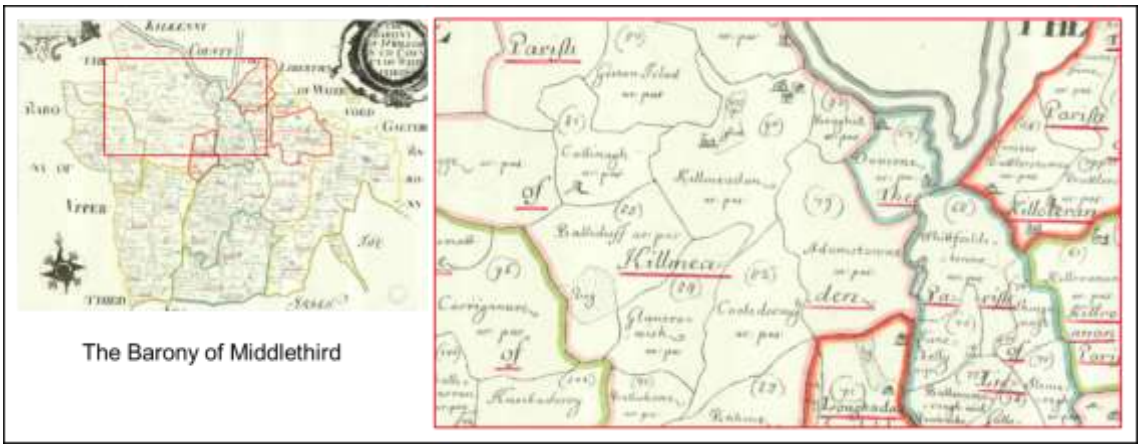


Figure 12.4 Extract from the Down Survey map of the Parish of Kilmeaden



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Figure 12.5 Extract from the first edition Ordnance Survey map of Blackknock and Adamstown; 6 inch to the mile, colour

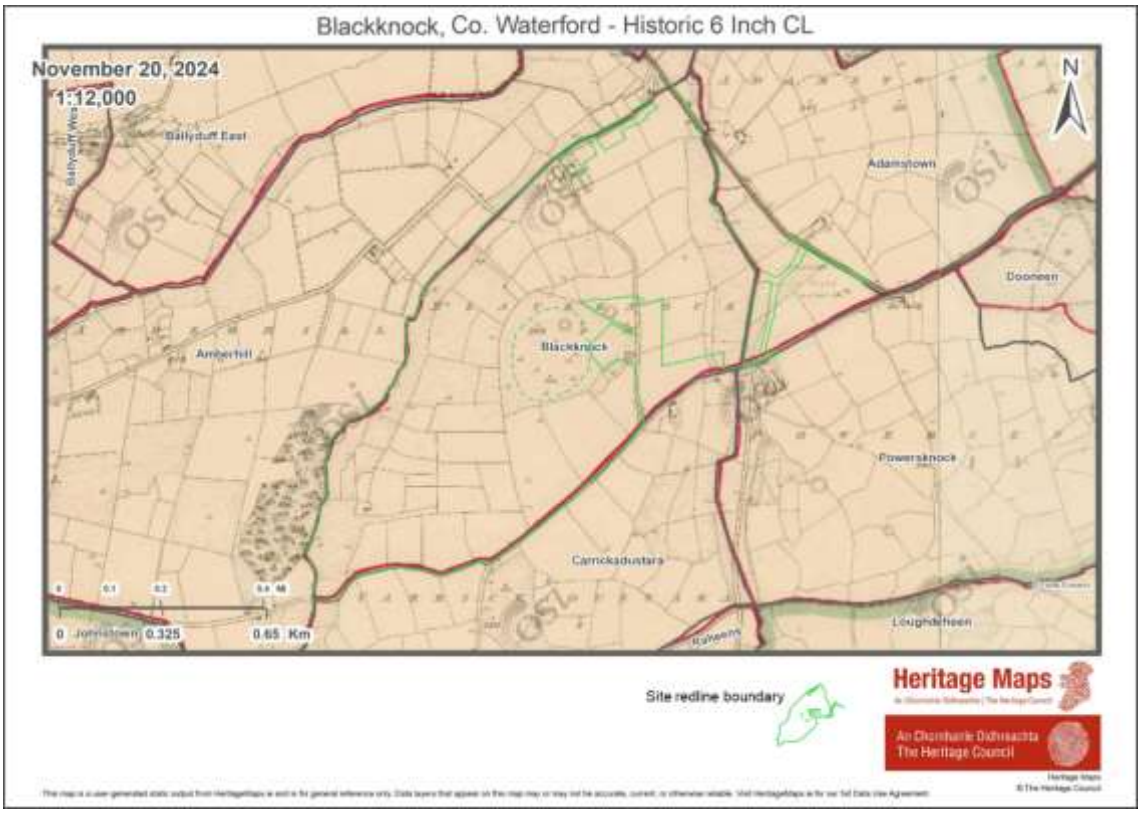


Figure 12.6 Extract from the first edition Ordnance Survey map of Blackknock and Adamstown; 6 inch to the mile

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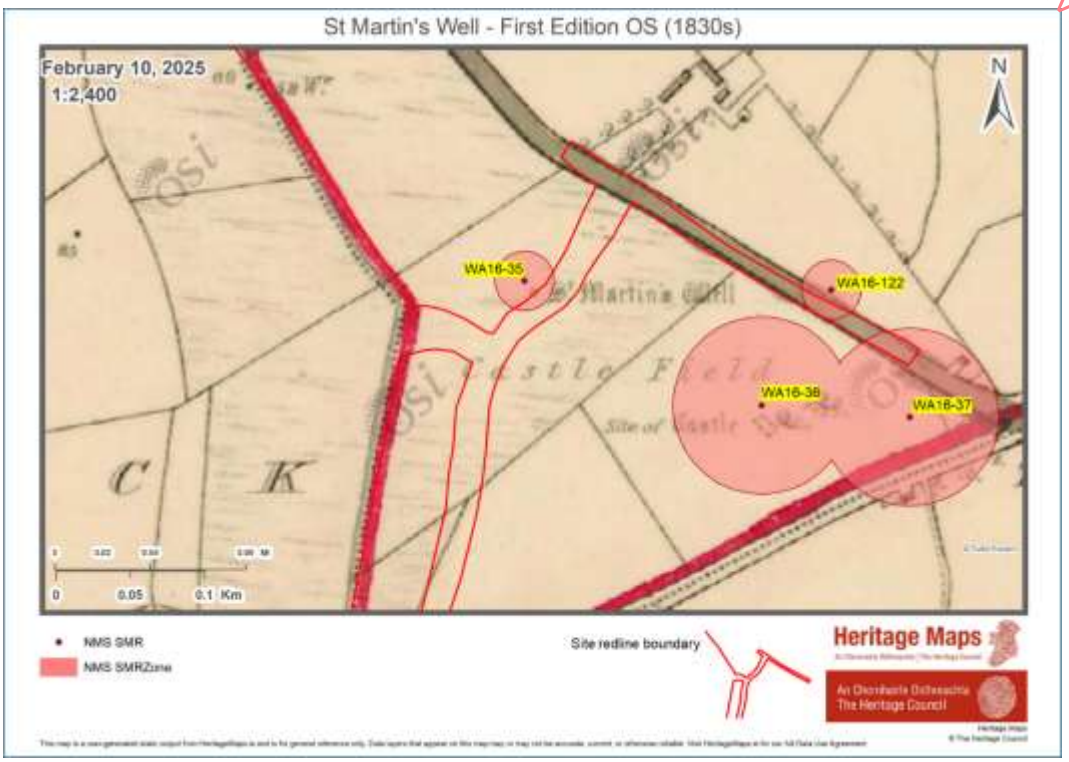


Figure 12.7 Extract from the second edition Ordnance Survey map of Blackknock and Adamstown; 25 inch to the mile

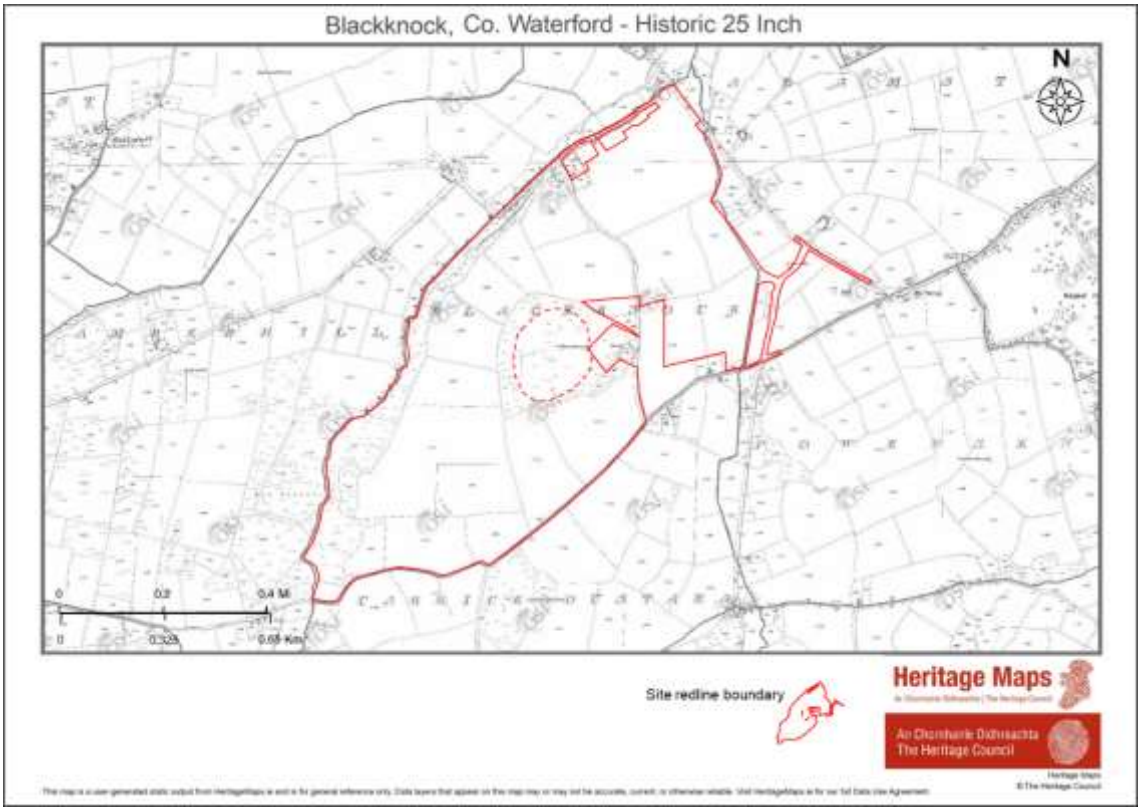


Figure 12.8 Extract from the Cassini edition Ordnance Survey map of Blackknock and Adamstown; 6 inch to the mile

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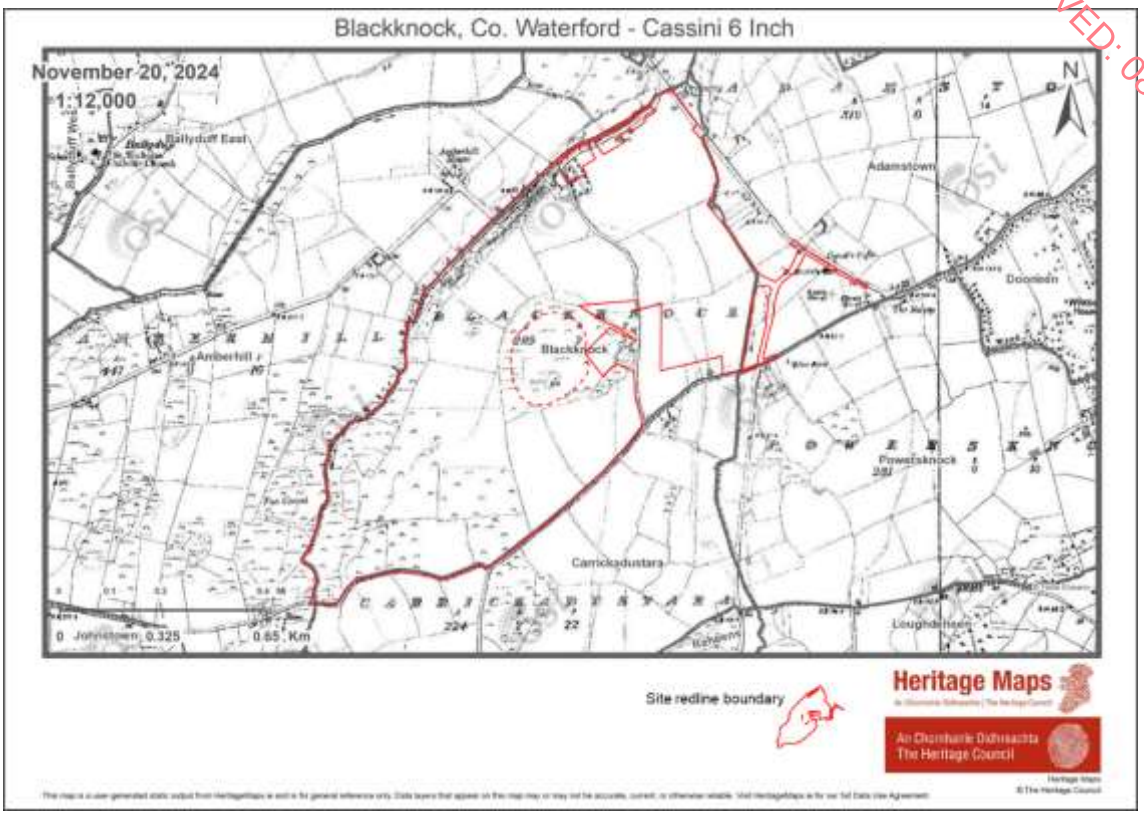


Figure 12.9 Extract from the Griffith's Valuation of Blackknock and Adamstown

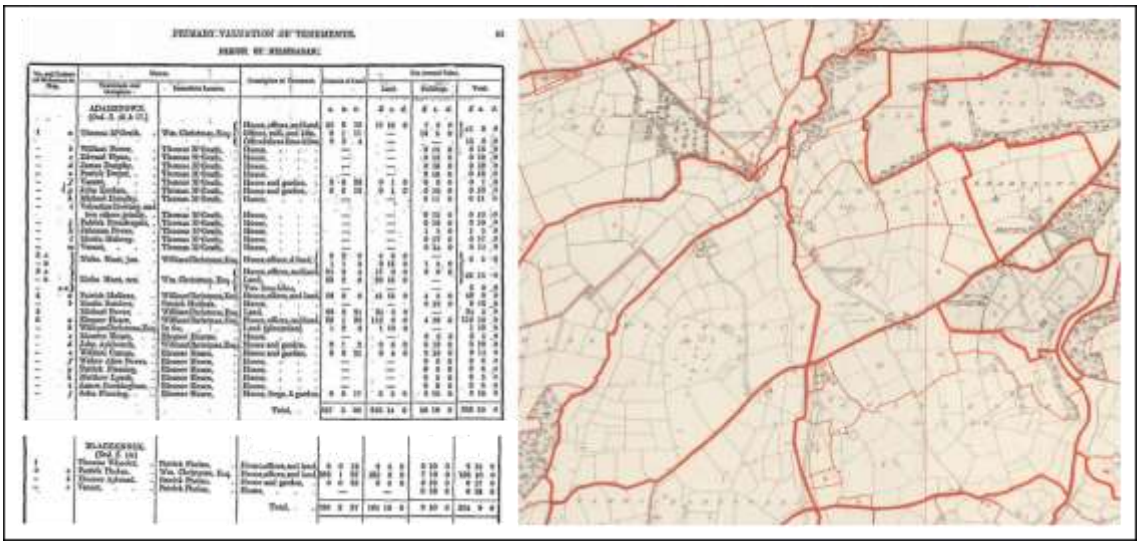
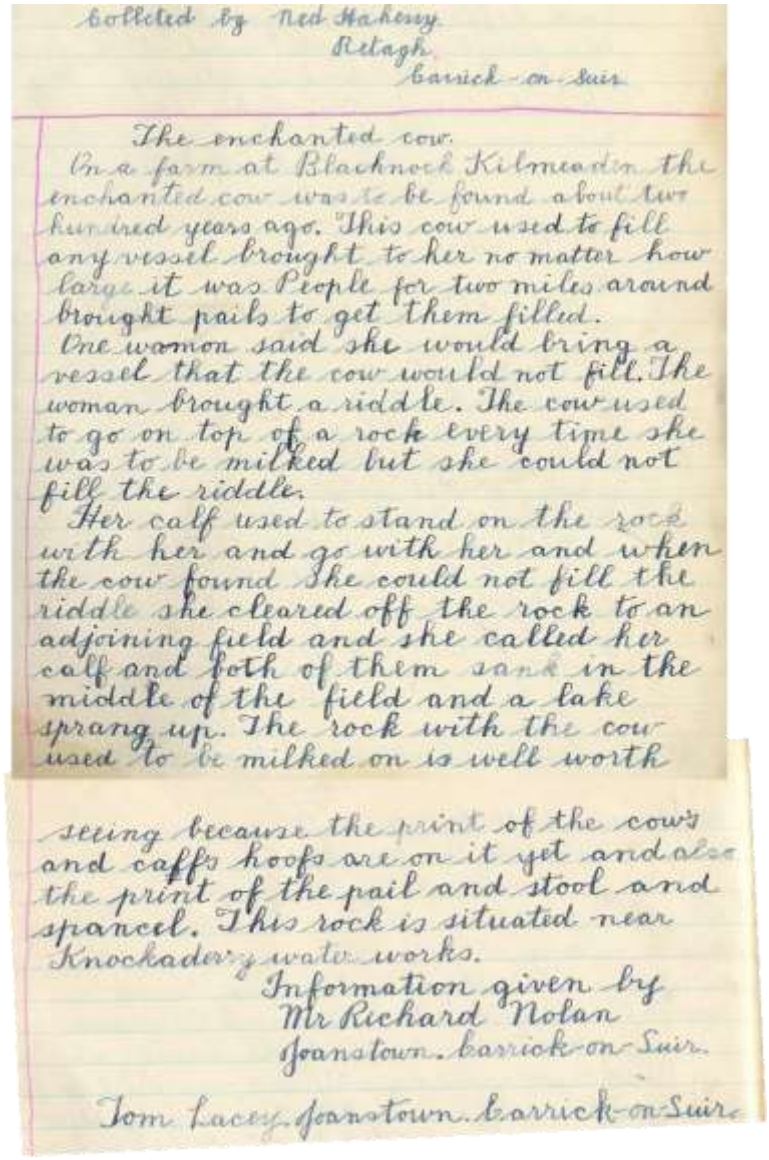


Figure 12.10 Extract from the Folklore Survey of Blackknock

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Collected by Ned Hackney
Ballagh
Carrick-on-Suir

The enchanted cow.

On a farm at Blackrock Kilmeaden the enchanted cow was to be found about two hundred years ago. This cow used to fill any vessel brought to her no matter how large it was People for two miles around brought pails to get them filled.

One woman said she would bring a vessel that the cow would not fill. The woman brought a riddle. The cow used to go on top of a rock every time she was to be milked but she could not fill the riddle.

Her calf used to stand on the rock with her and go with her and when the cow found she could not fill the riddle she cleared off the rock to an adjoining field and she called her calf and both of them sank in the middle of the field and a lake sprang up. The rock with the cow used to be milked on is well worth seeing because the print of the cow's and calfs hoofs are on it yet and also the print of the pail and stool and spancel. This rock is situated near Knockaderry water works.

Information given by
Mr Richard Nolan
Joanstown. Carrick-on-Suir.

Tom Lacey. Joanstown. Carrick-on-Suir.

Figure 12.11 Aerial Photograph of Blackknock and Adamstown, 1995



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Figure 12.12 Aerial Photograph of Blackknock and Adamstown, 2000



Figure 12.13 Aerial Photograph of Blackknock and Adamstown, 2005



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Figure 12.14 Aerial Photograph of Blackknock and Adamstown, OSI Ortho



Figure 12.15 Aerial Photograph of Blackknock and Adamstown, OSI Digital Globe



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Figure 12.16 Aerial Photograph of Blackknock and Adamstown, Google Maps (accessed March 2025)



12.3.2 Archaeological and Historical Background

12.3.2.1 Pre-history (c. 7000 BCE – 400 AD)

There is no direct evidence of stone age human activity in the study area. There is however evidence of human habitation in the wider area in the Mesolithic (middle stone age; c. 7,000 BCE – 4,000 BCE), for example in the form of lithic assemblages found during excavations at Coxtown East (Excavation number 1987:50) and Creadan Head (Excavation number 2016:790). Similarly, whilst there are no recorded archaeological sites or finds dating to the Neolithic (new stone age; c. 4,000 BCE – 2,500 BCE), there is ample evidence of human settlement in the wider area dating from this period. For example, there are 28 megalithic structures recorded in the county of Waterford (https://archaeology.ie).

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The earliest definitive evidence of human habitation within the study area dates to the Bronze Age (c. 2,500 BCE – 500 BCE), in the form of two fulachta Fiadh (SMR numbers WA01-130001- and WA016-130002) identified during advance archaeological investigations as part of a development process in the townland of Ballyduff East (Excavation number 2004:1661). Furthermore, three burnt mounds have been identified at Powersknock (SMR number WA016-038----) and Loughdeheen (SMR numbers WA016-108---- and WA016-110----). Fulacht fiadh or burnt mounds comprise mounds of charcoal rich soil, heat-fractured stones accompanied by a trough sometimes lined with wooden planks, stone slabs or even clay (Waddell 2000). They are generally located close to water sources including streams, rivers, lakes or marshy ground. The exact use of these sites is still somewhat ambiguous with their traditional interpretation as cooking places coming into question in recent years. They date predominantly to the Bronze Age but date ranges from the Mesolithic period to the medieval period have been returned. These features may be indicative of cooking and/or other related activities. Further evidence of Bronze Age activity in the wider area includes three standing stone at Powersknock (SMR number WA016-038----) and Raheens (SMR numbers WA016-112---- and WA016-113----). Standing stones are also a feature of Bronze Age Ireland, as boundary or grave markers. Finally, pre-development archaeological excavations uncovered Bronze Age human settlement at Adamstown in the form of hut sites (SMR numbers WA017-123001-, WA017-123002- and WA017-123003-; Excavation numbers 2002:1979, 2003:1854 and 2004:1656).

There is a general lack of evidence from the Iron Age (500 BC-500 AD) in the Irish archaeological record. Iron objects are found rarely but there is no evidence for the warrior culture of the rest of Europe although the distinctive La Tené style of art with animal motifs and spirals was adopted. Ireland at this time was a patchwork of larger and smaller kingdoms known as túath and trícha cét respectively. During this period, Ireland is depicted in the surviving historical sources as entirely rural.

12.3.2.2 Early Medieval Period (c. 400 AD – 1100 AD)

Christianity arrived in Ireland in the early part of the fifth century AD and is testified by the numerous early monastic site and churches. This is attested to by the church and holy well at Adamstown (SMR numbers WA016-037---- and WA016-035----). The holy well is depicted on early editions of the Ordnance Survey maps as St Martin's Well (see below).

Secular habitation during this period is characterised by defensive enclosures known as ringforts, which were constructed to protect farmsteads. These are one of the most frequently recorded archaeological site types and c. 50,000 examples are recorded in the Irish landscape. Ringforts are regarded as defended family homesteads and the dating evidence to date suggests they were primarily built between the seventh and ninth centuries AD (Stout 1997, 22–31). There are four ringforts recorded from the study area, two within the Proposed Development footprint in Blackknock (SMR numbers WA016-033---- and WA016-034----) and two in Powerstown (SMR numbers WA016-039---- and WA016-040----). Many ringforts have been partially or completely destroyed since the 1960s and often the only indication of the former presence of a ringfort is preserved in townland name elements such as Dún, Rath, Cashel or Lios. However, monuments which have experienced above-ground disturbance continue to be of archaeological interest due to the potential for subsurface remains to exist at their locations. The enclosure at Raheens may be the sub-surface remains of a ringfort (SMR number WA016-041----).

There are also two souterrains (or underground passages) recorded in the study area, one in Carrickadustara (SMR number WA016-109----) and another in Raheens (SMR number WA016-114----).

Souterrains are often associated with ringforts and are generally regarded as having had a defensive or protective function, as evidenced by the complex construction of many of the sites, with narrow winding passages, deliberate obstructions and small chambers. Raiding was endemic during the early medieval period and souterrains may have served to house portable valuables and non-combatants during a raid (Clinton 2001).

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One of the most significant Viking sites found in Ireland is located just outside of the study area at Woodstown, Co. Waterford, on the eastern bank of the River Suir. Discovered during pre-development archaeological testing in advance of the Waterford city bypass in 2003, c. 600 features including pits, hearths, and cobbled surfaces were initially discovered. Geophysical survey confirmed that the activity was largely confined within a double ditch enclosure. Further work determined that the site was one, or perhaps two, D-shaped enclosures occupying an area (dims. c. 500m NNE-SSW; c. 150m E-W) extending N from the wetland around the point where the SE-NW Killoteran stream enters the Suir. Once the extent of the monument was recognised the by-pass route was altered early in 2005 so that the monument will be preserved in situ. An underwater survey of the river (06E0972) produced little evidence of structures in the dredged channel (Schweitzer 2009).

Necessary work during 2004 involved the culverting of a stream at the N extremity of the site when 15m of a bank and outer fosse (Wth 2.9-4m; D 1.5-1.8m) were excavated, including an entrance gap (Wth 7.4m) associated with metalled surfaces. Metal-working was conducted in the vicinity and in the fosse. C14 results from the fosse indicate that it was constructed in the early 5th century AD. Later, the fosse was partly re-cut (Wth 1.4m; D 0.4m), with an outer fosse (Wth 1.5m; D 0.5m) 1-2m distant. With the arrival of Vikings the site could have developed into a longphort, a fortified quasi-urban area providing a long riverine shore where boats could be beached. A Viking warrior burial (WA009-019001-) with armour and weapons was found outside the fosses at N, and two kilns (WA009-019002-) are probably associated with this phase. Further small excavations and Geophysical survey (E2964) during 2007 identified a structure (WA009-019003-) that is probably associated with metal-working and clarified the E perimeter of the monument (Russell 2010).

Over 4000 artifacts were recovered, although less than 600 were stratified. Amongst the artifacts are silver arm-rings, silver ingots, and lead weights suggesting occupation by Viking raiders or traders, but most artifacts represented trades, particularly woodworking and metal-working, and everyday domestic use. The presence of part of a Kufic coin, originating in Arabia, testifies to the importance of trade during the later period. The C14 dates and the lack of medieval pottery suggest that this settlement was probably abandoned by the middle of the 11th century when occupation may have commenced in Waterford City (O'Brien and Russell 2004, 2005; Russell and Harrison 2011).

12.3.2.3 Later Medieval Period (c. 1100 AD – 1650 AD)

The Anglo-Norman's arrived in Ireland in 1169, to support the deposed king of Leinster, Diarmuid MacMurchadha. By the end of the 12th century the Anglo-Normans had succeeded in gaining control over much of the country. Leinster was 'sub-infuedated', meaning that great swathes of land were parcelled out among the Anglo-Norman elites. The Anglo-Norman tenurial system more or less appropriated the older established land units known as túaths in the early medieval period but described the territories as manors (MacCotter 2008).

The southeast of Ireland was the starting point of the Anglo-Norman invasion and the first to fall, due to the disposed king of Leinster, Diarmait Mac Murchada's alliances with the Earl of Pembroke (Ricard de Clare, known as Strongbow) and other Anglo-Norman knights such as Robert Fitz Stephens (Colfer and Colfer 2109).

A castle is recorded in Adamstown (SMR number WA016-036----). Lewis's topographical dictionary (1837, Vol. 2, 176) described Kilmeaden Castle as being the chief seat of the Poers (see below).

12.3.2.4 Post-Medieval Period (c. 1650 AD – 1900 AD)

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The seventeenth century witnessed the systematic reduction of all of Ireland to English authority, largely through conflicts and the forced settlements, 'The Plantations'. As part of the process of achieving colonial dominion a number of surveys and mapping programmes were completed throughout the post-medieval period. The Down Survey (undertaken in 1656–58) was overseen by the surgeon-general of the English army, William Petty and a number of former soldiers. This survey It was not just a project of mapping but of social engineering that was underpinned by a massive transfer in landownership from Irish Catholics to English Protestants. This survey is the first ever detailed land survey on a national scale anywhere in the world and gives great insight in Ireland at this time. The above mentioned Kilmeaden Castle is recorded as having been defended by the Poers against the forces of the Cromwellian army, but it was defeated and destroyed, with the unfortunate Poer hung from a tree and the estate divided among the Cromwellian soldiers (ibid.).

A thatched stone house is recorded on the terrier of the Down Survey map of Kilmeaden parish (1655-6) at Adamstown, and the land at Adamstown was owned by Maurice Power in 1640 (Simington 1942, 138; see Figures 12.2 – 12.4). This field was known as the 'castle field' in the 19th century according to J. O'Donovan (O'Flanagan 1929, 25), but there is no visible evidence of a castle at ground level (SMR number WA016-036----).

The first (Figure 12.5 – 12.6), second (Figure 12.7) and Cassini (Figure 12.8) editions of the Ordnance Survey maps dating to the early 19th, early 20th and middle 19th century respectively, show the site as being in agricultural land comprising a small number of fields. It is notable that the aforementioned ringforts (SMR numbers WA016-033---- and WA016-034----) are clearly depicted on the first edition maps, but not thereafter. As noted above, the holy well and castle at Adamstown (SMR numbers WA016-035---- and WA016-036----) are depicted on early editions of the Ordnance Survey maps as 'St Martin's Well' and 'Site of Castle' respectively (see Figure 12.6).

The Griffith's Valuation for Adamstown and Blackknock value the buildings and land in the mid-19th century as follows: Adamstown buildings £50 16 shillings, land £256 and 14 shillings; Blackknock buildings £9 and 10 shillings, land £194 and 10 shillings (Figure 12.9).

The census records of 1901 and 1911 are an interesting insight into life at the turn of the 20th century and its links to the previous centuries. The total population of Adamstown and Blackknock townlands in 1901 was 95, and this increased to 102 in 1911. In an interesting throwback to Anglo-Normal times, the most common surname in 1901 (41) and 1911 (37) was Power (https://nationalarchives.ie/collections/search-the-census/).

The folklore commission includes a lovely description of a natural rock formation at Blackknock (SMR number WA016-075---- (redundant record); see Figure 12.10; https://www.duchas.ie/en).

> *Long ago there were people living in Blacknock, near Kilmeaden, about seven miles from Waterford, and they had a good milking cow, and she died. So one day, a cow, and a calf, came to them, and this cow was a good milking cow. Any vessel that would be put under her, she would fill it. So one day, the servant brought out, a sieve, and the cow could not fill it, but the servant kept on milking her. So the cow and calf bawled, and ran down the field, and were never heard of again. There is a place in Blacknock "called the cow's track", where the footsteps of the cow and the three holes of the milking stool, are still to be seen there.*

Modern aerial photography shows the development of the landscape in recent times. In 1995 (Figure 12.11) the land proposed for development is agricultural, comprising a series of fields very similar to as they were depicted in the Cassini edition of the Ordnance Survey maps. A significant change can be seen in the 2000 edition aerial photograph, with the development of the Kilmeaden cheese plant, resulting in substantial landscaping of the townland of Blackknock (Figure 12.12). No substantive changes to the landscape are noted between 200 and subsequent editions up to the Google maps (Figures 12.13 – 12.16).

12.3.3 Townland Boundaries

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The proposed development route traverses the townland boundary between Adamstown and Blackknock (see Figure 12.1 and Figure 12.5), which within the footprint of the Proposed Development is along the line of a watercourse. The Townland is the smallest administrative division in the country and varies in size from approximately 1 acre to 7000 acres. All other territorial divisions are collections of townlands. There are circa 51,000 townlands in the Republic of Ireland. It is known that townland boundaries can be ancient; some being in existence since pre-historic times (Bourke 2018).

12.3.4 Architectural Heritage

There are four recorded architectural heritage sites within the study area, of which two are included in the Record of Protected Structures for Co. Waterford, in Adamstown (a post box (NIAH number 22901615; RPS number WA750844); and a cottage (NIAH number 22901607; RPS number WA750128). The remaining two not listed in the Record of Protected Structures are a gate lodge (NIAH number 22901712) and gates/railings/walls (NIAH number 22901722) in Dooneen. All of these date to the mid-19th century, except the post box, which dates to the early 20th century.

12.3.5 Field Survey

A site walkover survey was undertaken on 16 January 2025 in sunny dry weather (see Figure 12.17 for photograph locations and orientations and Figures 12.18 – 12.44 for survey photographs). The land proposed for development can be divided topographically into two zones. The majority of the proposed land, comprising most of the townland of Blackknock, west of the local road which bisect the Proposed Development land is hilly agricultural land, sloping to the northwest and northeast to watercourses. The land is principally grazing agricultural land. The impact in the landscape of the Kilmeaden cheese plant, although now disused and overgrown, is very clear on the ground (e.g. see Figure 12.27).

There is no evidence at surface level of the above mentioned ringforts (SMR numbers WA016-033---- and WA016-034----) as depicted on the first edition Ordnance Survey maps (Figures 12.5 – 12.6; see Figures 12.36 – 12.38).

Bedrock is exposed at several locations at the top of the hill at Blackknock, and a number of potential candidates for the ritual stone as described in the folklore commission as noted above were identified, the most likely being at Figure 12.39 (P22).

To the east of the local road which bisects the Proposed Development lands the topography is more flat lying. It comprises land under crop and in open pasture. The watercourse which defines the townland boundary between Adamstown and Blackknock is interesting as the land either side of it is quite waterlogged and, given the discovery of fulacht fiadh in the study area, can be considered an area of potential for discovery of such sites (see Figure 12.21). No visible trace of the holy well (SMR number WA016-035----), castle (SMR number WA016-036----) or church (SMR number WA016-037----) was evident (see Figures 12.43 – 12.44).

Figure 12.17 Field survey photograph locations and orientations.

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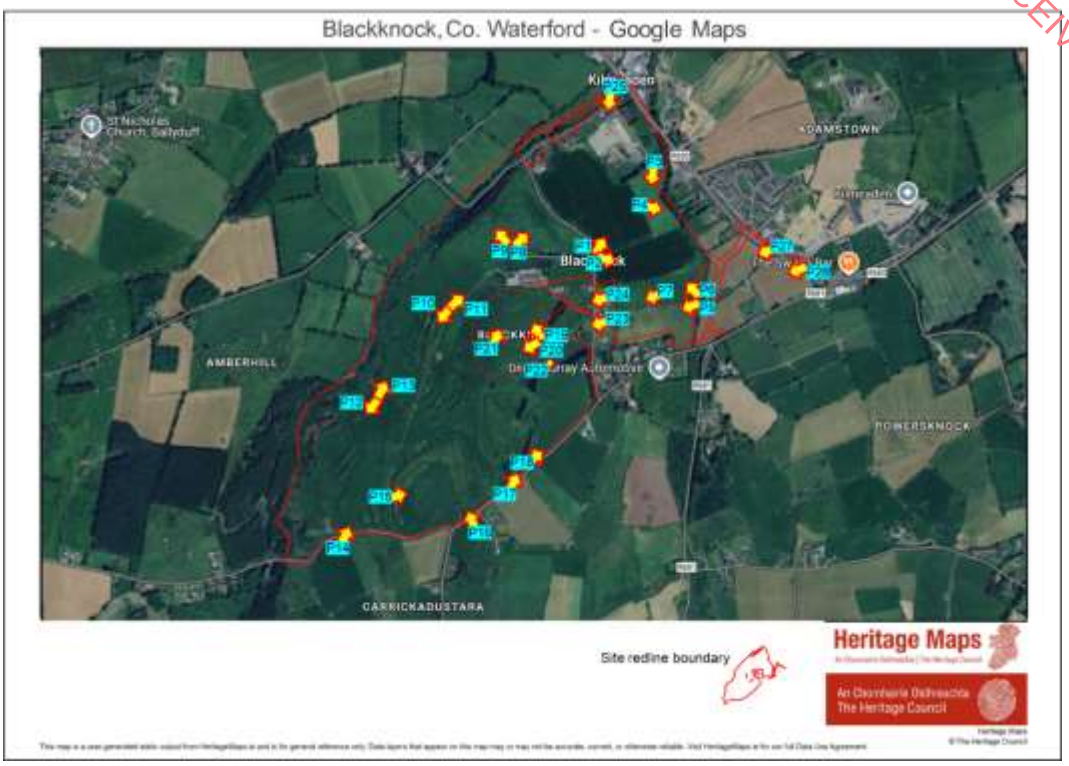


Figure 12.18 Photograph 1 (P1) facing northeast



Figure 12.19 Photograph 2 (P2) facing east



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Figure 12.20 Photograph 3 (P3) facing south



Figure 12.21 Photograph 4 (P4) facing southeast towards marshy ground



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Figure 12.22 Photograph 5 (P5) facing west-southwest



Figure 12.23 Photograph 6 (P6) facing northwest



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Figure 12.24 Photograph 7 (P7) facing west-southwest



Figure 12.25 Photograph 8 (P8) facing northeast



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Figure 12.26 Photograph 9 (P9) facing northwest



Figure 12.27 Photograph 10 (P10) facing southwest



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Figure 12.28 Photograph 11 (P11) facing northeast



Figure 12.29 Photograph 12 (P12) facing southwest



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Figure 12.30 Photograph 13 (P13) facing northeast



Figure 12.31 Photograph 14 (P14) facing northeast

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Figure 12.32 Photograph 15 (P15) facing northeast



Figure 12.33 Photograph 16 (P16) facing northwest

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Figure 12.34 Photograph 17 (P17) facing northeast



Figure 12.35 Photograph 18 (P18) facing northeast

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Figure 12.36 Photograph 19 (P19) facing northwest



Figure 12.37 Photograph 20 (P20) facing southwest

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Figure 12.38 Photograph 21 (P21) facing northeast



Figure 12.39 Photograph 22 (P22) possible location of cup marked stone (SMR Redundant record WA016-075----)

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Figure 12.40 Photograph 23 (P23) facing northwest



Figure 12.41 Photograph 24 (P24) facing northwest

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Figure 12.42 Photograph 25 (P25) facing south



Figure 12.43 Photograph 26 (P26) facing southwest

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Figure 12.44 Photograph 27 (P27) facing southwest



12.4 Characteristics of the Proposed Development

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The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

12.4.1 Construction Phase

In relation to archaeology, architectural and cultural heritage, the Proposed Development can be divided into two components, the main site (data centre, village centre, energy centre and warehouses), and the solar panel array (including battery storage). The former (main site) will comprise substantial ground disturbance in the construction of buildings, services and access. Construction of the solar panel array will require minimal ground disturbance. There will be further ground disturbance during the construction phase to facilitate the construction programme and methodology.

12.4.2 Operational Phase

There will be no ground disturbance during the operational phase of the Proposed Development.

12.5 Potential Impacts of the Proposed Development

12.5.1 Construction Phase

The potential impacts of the Proposed Development on archaeological and architectural heritage can be summarised as follows:

There are three recorded archaeological sites or monuments within the Proposed Development lands, as listed in the Record of Monuments and Places. Two are ringforts (SMR numbers WA016-033---- and WA016-034----) and have no visible surface expression, and one is a redundant record (a rock outcrop with natural impressions recorded in local folklore; WA016-075----). None of these will be directly impacted by the Proposed Development, but there is the potential for them to be impacted on by construction traffic.

A further four recorded sites are located just outside of the eastern portion of the Proposed Development boundary; St Martin's Well, a castle (site of), a church (site of) and boundary stone (SMR numbers WA016-035----, WA016-036----, WA016-037----, WA016-122---- respectively). The Proposed Development will not directly impact on these, but it will directly impact in the zones of notification of the holy well (SMR number WA016-035----) and castle (WA016-036----). It is important to note that there is no visible trace of these sites above ground, and their exact locations and extent, should elements of them survive sub-surface, is not known.

There are an additional nineteen recorded archaeological sites within c. 500m of the Proposed Development lands, none of which will be impacted, either directly or indirectly, by the Proposed Development works.

The Proposed Development will directly impact a portion of the townland boundary between Adamstown and Blackknock. The boundary here consists of a watercourse, but boundaries of this nature can be in the form of wide and deep ditches, traces of which can survive sub-surface. Should they exist, they could potentially be impacted by construction works.

A desk-top survey of the lands proposed for development, did not highlight any additional, previously unrecorded, archaeological features.

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However, the archaeological sites in the study area, coupled with the results of archaeological excavations are indicative of the landscape having been populated since early prehistory and throughout the Medieval and Post-Medieval periods.

Therefore, there is the potential for previously unrecorded archaeological material to be uncovered during the course of development works.

There are no recorded architectural heritage sites within the Proposed Development lands, as listed in the National Inventory of Architectural Heritage. There are four recorded NIAH sites within c. 500m of the Proposed Development lands, two of which are listed in the Record of Protected Structures for Co. Waterford. None of these will be impacted, either directly or indirectly, by the Proposed Development works.

Therefore, the potential impact of the Proposed Development on the archaeological, architectural and cultural heritage is deemed to be ***negative, slight*** and ***permanent***.

12.5.2 Operational Phase

No direct impacts on archaeological, architectural and cultural heritage are expected as a result of the operational phase of the Proposed Development.

12.6 Mitigation Measures

To mitigate against the potential impacts of the Proposed Development on archaeological heritage, the following will be required:

A suitably qualified archaeological consultant should be retained to oversee the archaeological and architectural mitigation strategy for project from design through to planning and construction phase.

At pre-construction phase, should ground conditions permit, a geophysical survey should be undertaken under license to the National Monuments Service, of areas that will be subject to development or construction-related impacts. Archaeological geophysics is a non-invasive survey, using a variety of techniques (typically high-resolution magnetometry and advanced multichannel fluxgate gradiometery), to investigate sub-surface archaeological features. The aim of the survey will be to determine the location, form and extent of the recorded archaeological sites within the footprint of the Proposed Development, and to identify previously unrecorded sub-surface features of archaeological potential.

Also at pre-construction phase, licensed archaeological testing should be undertaken of anomalies identified by the geophysical survey. Further test excavation of areas where no features were positively identified should also be undertaken, to alleviate the risk of them being uncovered during the construction phase(s).

Any archaeological features identified positively by testing in areas where they will be impacted on, directly or indirectly, by the development, will require permission from National Monuments for the excavation (preservation by record) of these remains.

Sufficient time will be required for the archaeological team to complete their site investigations, and if required, excavations. If archaeological excavations are required, it may be possible to undertake the works in phases to allow construction works to be phased, i.e. it may be possible to commence construction is areas of the site where archaeological features have been excavated and the areas stripped of topsoil and assessed. However, this will require specific permission from National Monuments.

Should these mitigation measures be implemented, the potential impact of the Proposed Development on the archaeological, architectural and cultural heritage is deemed to be ***negative, not significant*** and ***permanent***.

Please note that the recommendations given here are subject to the approval of the National Monuments Service, Department of Housing, Local Government and Heritage.

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12.6.1 Construction Phase

Dependent on the results of the geophysical survey and archaeological testing undertaken at pre-construction, in consultation with the National Monuments Service, a programme of archaeological monitoring may be required during the construction phase.

Suitable exclusion zones should be put in place around the recorded archaeological sites within or adjacent to the Proposed Development, to alleviate the risk of accidental impact on these sites due to construction works:

- The two ringforts (SMR numbers WA016-033---- and WA016-034----)
- The redundant record (SMR number WA016-075----)
- St Martin's Well (SMR number WA016-035----)
- The castle (site of) (SMR number WA016-036----)
- The church (site of) (SMR number WA016-037----), and
- The boundary stone (SMR number WA016-122----).

12.6.2 Operational Phase

No mitigation measures are required for archaeological, architectural and cultural heritage during the operational phase of the Proposed Development.

12.7 Monitoring or Reinstatement Measures

12.7.1 Construction Phase

As noted above, dependent on the results of the geophysical survey and archaeological testing undertaken at pre-construction, in consultation with the National Monuments Service, a programme of archaeological monitoring may be required during the construction phase.

12.7.2 Operational Phase

There are no ongoing monitoring or reinstatement requirements during the operational phase relating to archaeological, architectural and cultural heritage.

12.8 Residual Effects of the Proposed Development

12.8.1 Construction Phase

There are no identified residual effects during the construction phase relating to archaeological, architectural and cultural heritage. Should previously unknown sub-surface archaeological features be encountered during the course of the implementation of mitigation measures, the excavation of these will add to the academic knowledge and therefore be a ***positive, long term*** and ***moderate*** effect.

12.8.2 Operational Phase

There are no identified residual effects during the operational phase relating to archaeological, architectural and cultural heritage.

12.9 Cumulative Impacts of the Proposed Development

12.9.1 Construction Phase

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Of the ten archaeological investigations undertaken in advance of or during previous development works, seven have yielded archaeological features dating from the Bronze Age to the Post-Medieval period. Should archaeological features be uncovered during testing or monitoring of the Proposed Development, these will be archaeologically excavated, and the knowledge added to the academic record.

The academic knowledge gained from the excavation of these features, has resulted in a net cumulative ***permanent***, ***significant***, ***positive*** impact.

12.9.2 Operational Phase

During operation there is no potential for cumulative impact as there will be no disturbance to ground.

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Chapter 13 – Traffic and Transportation

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13. TRAFFIC AND TRANSPORTATION

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13.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of the Proposed Kilmeaden Masterplan Development at Kilmeaden, Waterford on the surrounding traffic and transportation network and identifies the mitigation measures where required.

The key objectives of the assessment are to:

- Determine the potential effects on the relevant junctions of the surrounding road network.
- Provide any mitigation measures, if required.

13.2 Study Methodology

13.2.1 Assessment Methodology

The methodology for this Chapter was developed using recognised national assessment guidelines and is outlined in the following sections. The assessment was undertaken using desktop research, policy review, geographical information systems (GIS) mapping, site visits, traffic surveys and traffic modelling.

13.2.1.1 Defining Significance

The 2022 Environmental Protection Agency (EPA) guidelines included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports, identify that significance of effects.

> *"Is usually understood to mean the importance of the outcome of effects (consequences of the change). Significance is determined by a combination of (objective) scientific and subjective (social) concerns". (Section 3 page 49)*

In general, impact significance is defined using a combination of sensitivity (e.g., high, medium and low) of the environmental feature and the magnitude of impact (e.g., major, moderate, slight and negligible).

The criteria for assessing sensitivity and magnitude level have been defined in Table 13.1 and Table 13.2. The overall significance of an impact, taking the relationship between sensitivity and the magnitude level into consideration, is set out in Table 13.3.

The significance level attributed to each effect has been assessed based on the magnitude of change due to the Proposed Development and the sensitivity of the affected receiving environment to change.

13.2.1.2 Receptor Sensitivity (or significance)

The criteria for assessing the traffic and transport sensitivity are defined according to the matrix as set out in Table 13.1 below.

Table 13.1 - Sensitivity and Description of Impact

Sensitivity Description of Impacts	Criteria
High	Receptors of greatest sensitivity to change such as highly congested links or junctions, which have a low capacity to accommodate change without significant effect arising.
Medium	Links and junctions which have a moderate capacity to accommodate change without significant effects arising.
Low	Links and junctions which have a high capacity to accommodate change without significant effects arising
Negligible	Receptors with low sensitivity to traffic flows, those sufficiently distant from affected links and junctions and those that are very lightly used (relative to other modes within the study area) which have a very high capacity to accommodate change without significant effects arising.

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13.2.1.3 Magnitude of Impact

The criteria used to assess the magnitude of change are set out in Table 13.2. These criteria were used to identify the magnitude of change for quantitative assessment and were supported by professional judgement to take full account of the specific context in the study area.

Table 13.2 - Magnitude of Impacts Assessment Criteria

Magnitude of Impacts	Criteria
High / Major	Changes which are perceptible and would result in significant alterations to conditions.
Medium	Changes which are perceptible and would alter conditions which otherwise prevail.
Low / Small	Changes which are perceptible but would not alter conditions which otherwise prevail.
Negligible	Changes that is unlikely to be perceptible.

13.2.1.4 Significance of Impact and Typical Description

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The 2022 EPA guidance on information to be contained in EIAR has been used to categorise the significance of impact as shown in Table 13.3.

Table 13.3 - Significance of Effect Description

Significance of Effect	Description
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration and intensity significantly alters most of a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of sensitive aspects of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Neutral	No effect or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

13.2.1.5 Traffic and Transport Impact Matrix

The significance of effects for the traffic and transport assessment of the Proposed Development was based on the receptor sensitivity and the magnitude of impact. This is defined in Table 13.4.

Table 13.4 - Traffic and Transport Significance of Effect Matrix

Heading	Existing Environmental Significance / Sensitivity			
Magnitude of Impact	High	Medium	Low	Negligible
High	Profound	Very Significant	Moderate / Slight	Not Significant
Medium	Very Significant	Moderate	Moderate / Slight	Slight / Not Significant
Low	Significant / Moderate	Moderate / Slight	Slight / Not Significant	Not Significant
Negligible	Not Significant	Not Significant	Not Significant	Imperceptible

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Effects are generally considered significant (and in need of mitigation) if they are profound, very significant, significant or moderate. Slight and imperceptible effects are not considered to be significant.

Effects have been described as:

- Beneficial, neutral or adverse.
- Permanent or temporary.
- Short (< 5years), medium (5-10 years) or long term (10+ years).

Temporary effects are those associated with the demolition and construction activity, while permanent effects are those associated with the operation of the development.

13.2.1.6 Baseline Transport Review

A baseline transport review was completed via a desktop review of current planning policies and objectives, existing public transport services, the walking and cycling network and existing road infrastructure. This also included a review of relevant committed developments in the vicinity of the Proposed Development site.

13.2.1.7 Traffic Modelling

The proposed development took account of the entire Kilmeaden Masterplan lands including any nearby committed developments.

A junction impact assessment is undertaken for a number of key junctions within the vicinity of the proposed development. The full Kilmeaden Masterplan lands impact was assessed for opening year and future design year scenarios (+5 and +15) in accordance with TII Traffic and Transport Assessment Guidance. The approach undertaken for the assessment is detailed in the sub sections below.

13.2.1.8 Assessment Approach

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An initial screening and detailed assessment have been carried out in accordance with TII's Traffic and Transport Assessment Guidelines. During the screening stage, each site is evaluated against a percentage threshold, and those that exceed this threshold or are located in potentially sensitive areas are selected for further detailed analysis. These detailed assessments are conducted using junction modelling software, with the specific software used for evaluating the Kilmeaden Masterplan lands outlined in the following sections.

13.2.1.9 Design years

The assessment was undertaken for the following years as per section 3.3 of the NRA Traffic and Transport Assessment Guidelines :

- Opening Year – 2029
- Opening Year + 5 – 2034
- Opening Year + 15 – 2044

13.2.1.10 Modelling Scenarios

Junction assessments were conducted for each scenario as detailed in Table 13.5 below during the AM and PM peak periods.

Table 13.5 - Modelled Scenarios

No.	Name	Design Year	Trips
1	Opening Year Do Minimum	2029	Background Growth + Committed Development Trips
2	Opening Year All Development	2029	Sc 1 + Proposed Development trips
3	Opening Year Do Minimum + 5	2034	Background Growth + Committed Development Trips
4	Opening Year All Development +5	2034	Sc 3 + Proposed Development trips
5	Opening Year+ 15 Do Minimum	2044	Background Growth + Committed Development Trips
6	Opening Year+ 15 All Development	2044	Sc 5 + Proposed Development trips

13.2.1.11 Modelling Software

For the detailed analysis of Junctions, JCT LINSIG software was utilised. The terminology associated with the software is summarised below.

- **DOS:** This is the ratio of demand flow to capacity on a link. The saturation level is normally 90%. A degree of saturation below 90% represents a junction that is operating in an efficient and stable condition. If a link has a degree of saturation of between 90% and 100% it may still be operating to an adequate standard depending on the acceptability of queuing and delay. A degree of saturation of above 100% is considered to be over-capacity.
- **Mean Maximum Queue (MMQ):** The sum of the maximum queue on a link (including uniform, random and oversaturation queues) averaged over all the cycles in the modelled time period.
- **Average Delay:** The average delay for each passenger car unit (pcu) on the lane averaged over the modelled time period.
- **Practical Reserve Capacity (PRC):** A measure of how much additional traffic could pass through the junction whilst maintaining a maximum degree of saturation of 90% on all lanes. Measured as a percentage.

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13.2.1.12 Traffic Surveys

Junction Turning Counts survey were commissioned and undertaken by NDC during a weekday on 15th January 2025 i.e., Wednesday between 07:00 am to 07:00 pm for 12 hours. These surveys. were conducted for the key junctions summarised in the section below.

Based on the above traffic surveys the following peak hours were determined:

- AM Peak: The peak hour was identified to be between 08:00 to 09:00 AM for the entire network.
- PM Peak: The peak hour was identified to be between 05:00 to 06:00 PM for the entire network.

13.2.1.13 Junctions

In order to assess the existing traffic conditions in the Kilmeaden Village area, AtkinsRéalis completed a review of the local road network in the vicinity of the proposed development. Arising from this review, the main junctions likely to be impacted by the proposed development were identified as follows, with reference numbers.

Table 13.6 - Locations of Key Junctions

Reference	Location	Type
Junction 1	Carrick Road Roundabout	Roundabout
Junction 2	R680/L4020 Roundabout	Roundabout
Junction 3	R680/Lacka Road Priority Junction	Uncontrolled Junction
Junction 4	R680/Amberhill Priority Junction	Uncontrolled Junction
Junction 5	R680/R681 Priority Junction	Uncontrolled Junction
Junction 6	R680/R682/Bawnfune Road Signalised Junction	Signalised Junction

13.2.1.14 Background Growth

Background traffic has been forecasted to grow in accordance with TII's Alternate Growth Factors included in the Project Appraisal Guidelines – Travel Demand Projections (PE-PAG-02017), published in October 2021.

The proposed development lies within County Waterford, growth factors referenced for the analysis are summarised in Table 13.7.

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Table 13.7 - Growth Factors: TII Alternate

Period	County Waterford	
	LV	HV
2016-30	1.0609	1.1511
2030-40	1.1112	1.2800
2040-50	1.1998	1.5532

The net percentage growth of traffic compared to the count year (2023) for all assessment years is summarised in Table 13.8 below.

Table 13.8 - Growth Factors: TII Alternate

Assessment Year	County Waterford	
	LV	HV
2029	6%	15%
2034	11%	28%
2044	20%	55%

13.2.1.15 Baseline Traffic Volumes

The existing traffic volumes for the baseline AM Peak and PM Peak for all the junctions are summarised in the Table 13.9 below.

Table 13.9 - Existing Traffic Volumes

No	Existing Volume in PCU (AM Peak)	Existing Volume in PCU (PM Peak)
Junction 1	1955	1825
Junction 2	1257	1005
Junction 3	1213	974
Junction 4	1218	970
Junction 5	1372	1180
Junction 6	1548	1347

13.2.1.16 Trip Rates and Trip Generation

The TRICS database was utilised to determine the trip generation for the proposed units at Kilmeaden for both AM and PM Peak. This has been discussed in detail in the below sections

13.2.1.17 Mode Share

The likely modal split was determined from the 2022 census data for the Kilmeaden area. This has been discussed in detail in the below sections

13.2.1.18 Future Transport Infrastructure Review

This consisted of a review of current proposed future transport plans, strategies and infrastructure in the vicinity of the site in order to identify future short, medium and long terms transport proposals which may have a material impact on the travel behaviour associated with the proposed development.

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13.2.1.19 Development Proposal Review

This review took account of the proposed development in terms of provision for access by walking, cycling, public transport and by vehicles including private car and service and emergency access.

13.2.1.20 Baseline Information Sources

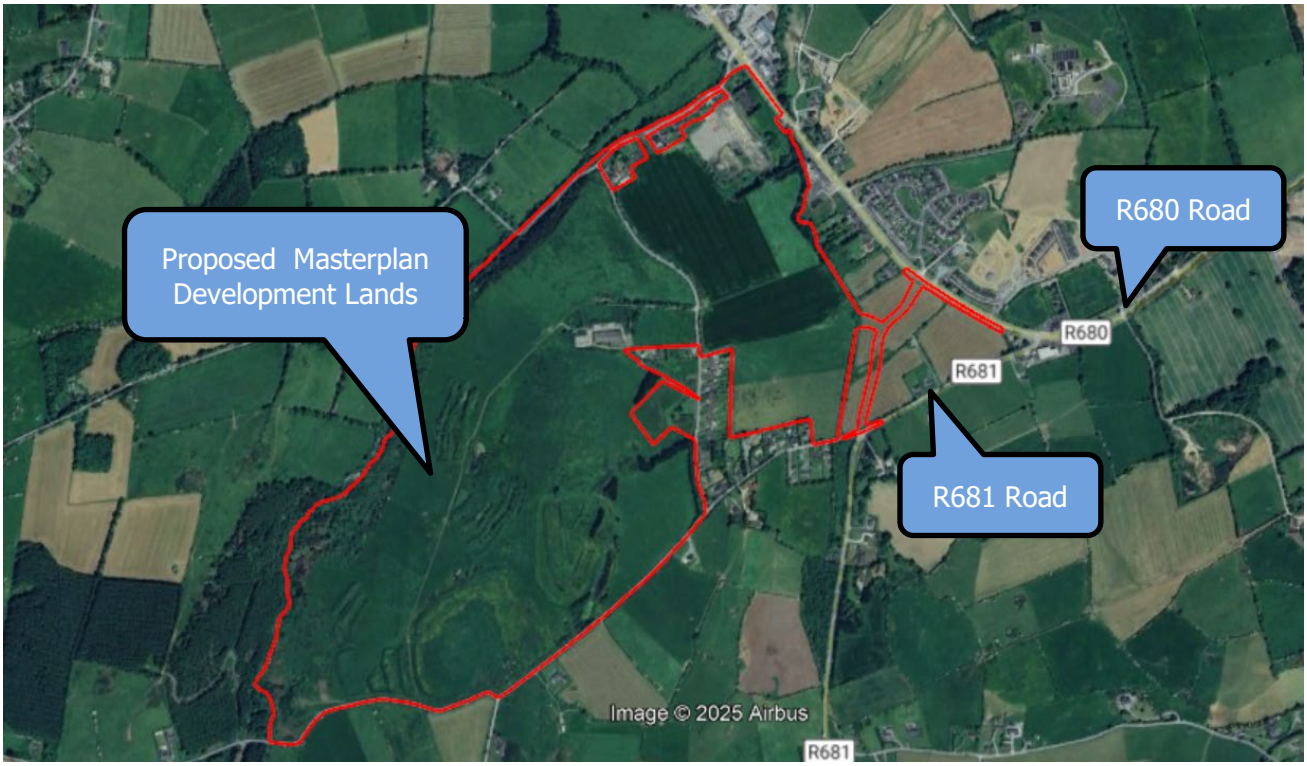
This assessment has been prepared from both a review of existing information on the site and a site-specific investigation.

13.3 Receiving Environment

13.3.1 Site Location

The proposed development is located in Kilmeaden, to the west of Waterford City, Co. Waterford. The development will be located near to the existing N25 Waterford City Bypass as well as the Waterford to Dungarvan Greenway. There are existing public transport services within Kilmeaden. The location of the proposed development can be seen in Figure 13.1.

Figure 13.1 - Site Location



The northern portion of the existing site includes the old Kilmeaden Cheese Factory, and it amounts for c. 3.81 hectares of the total site area. This area is considered brownfield as it was largely hard paved, with the remaining portion of the site considered greenfield, having never been previously developed. There is two existing watercourses running along the northern and eastern site boundary.

13.3.2 Existing Transport Infrastructure

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13.3.2.1 Pedestrian and Cycle Accessibility

13.3.2.2 Pedestrian

Footpath provision in general is adequate within Kilmeaden with most roads offering footpaths of ample width on both sides of the road in the vicinity of the development. There are a number of formal and informal crossing points provided along the R680. Along Amberhill Road footpaths are provided on one side of the road leading up to the proposed development's access.

13.3.2.3 Cycling

There is limited cycle infrastructure in the immediate vicinity of the site, meaning on the majority of roads cyclists have to mix with general traffic. Some nearby roads including the L4020 have on-road cycle tracks, and the site is 2km away from the Waterford to Dungarvan Greenway.

13.3.2.4 Public Transport Facilities

The existing bus routes in the receiving environment are displayed in Table 13.10 below.

Table 13.10 - Bus Routes in Kilmeaden

Bus Number	AM Peak Services (8-9am)	PM Peak Services (5-6pm)	Route
40	1	2	Wexford, Waterford, Kilmeaden, Dungarvan, Cork, Tralee
354	2	2	Carrick-On-Suir, Kilmeaden, Waterford, Dunmore East
362	1	1	Waterford, Kilmeaden, Kilmacthomas, Dungarvan
667	1	1	Dungarvan, Waterford Hospital

13.3.2.5 Road Network

The main public roads serving the proposed development are as follows:

- **N25 Waterford City Bypass:** The N25 connects the Rosslare Europort to Cork via Waterford City. The road is a dual carriageway in the vicinity of the site with a speed limit of 100kph.
- **R680:** The R680 is a single carriageway with a speed limit of 50kph in the vicinity of the site. The road connects Clonmel to Waterford City.
- **R681:** The R681 links Kilmeaden to Knockmahon and has a speed limit of 50kph.
- **R682:** The R682 has a speed limit of 80kph and links the N25 to Tramore.
- **Bawnfune Road:** The Bawnfune Road is located to the east of Kilmeaden and is connected to the R680 and R682.
- **Lacka Road:** Lacka road is a narrow rural route with a speed limit of 50kph.
- **Amberhill (Local Road):** Amberhill is the road along which the proposed site will be accessed. It has a speed limit of 50kph and arrives in Kilmeaden via a junction with the R680
- **L4020 Road:** The L4020 is a rural route to the north of Kilmeaden providing a connection to Ballyduff. The road has a speed limit of 50kph.

13.4 Characteristics of the Proposed Development

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This section provides detail about the quantum of development included in the proposed masterplan lands and utilised for the traffic impact assessment. The proposed development consists of various types of land uses which have been listed in Table 13.11 below. In addition, to the below listed facility a Multi-Use Game Area (MUGA) will also be facilitated with 1 court within the proposed development.

Table 13.11 - Schedule of Accommodation: Proposed Masterplan Lands, Kilmeaden

Land Use	Units
Residential Use	
Apartments (Block A and Block B)	48 units or 5394 sqm
Non - Residential Use – Village Centre	
Community Centre	837 sqm
Retail	602 sqm
Café	150 sqm
Gym	914 sqm
Health Centre	490 sqm
Offices	306 sqm
Pharmacy	195 sqm
Creche	1345 sqm
Supermarket	1508 sqm
Warehouse A	780 sqm
Warehouse B (Office Use)	352 sqm
Non - Residential Use – Technology Park	
Data Centre (3 ICT Buildings)	72099 sqm
Warehouse and Offices	5600 sqm
Energy Centre	3720 sqm

As part of the analysis, certain land uses were grouped together to estimate trips from the proposed development. Additionally, the Trip Generation and Distribution section details various other assumptions

considered in regards to estimation of proposed development trips. The grouped land uses for trip generation estimation are as follows:

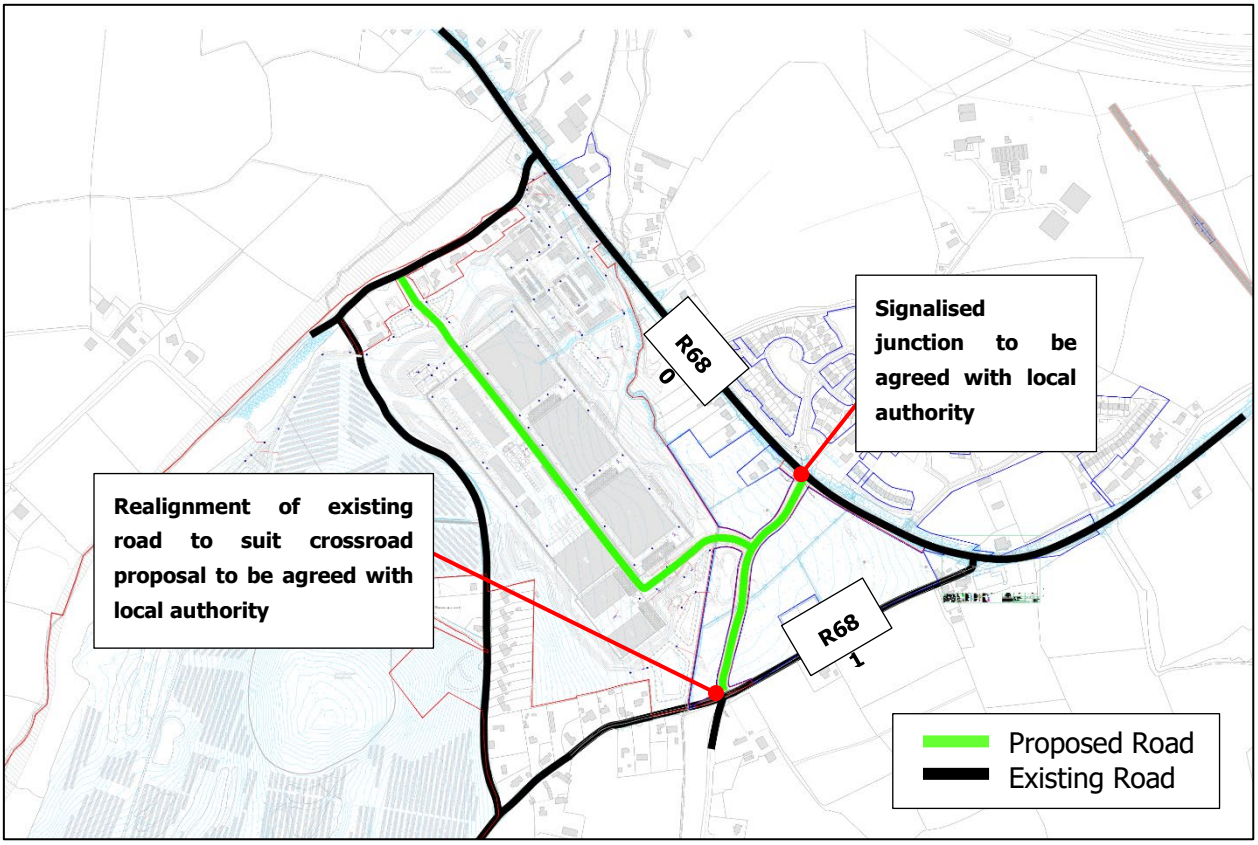
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- Warehouse: All warehouse land uses within the village centre and technology park
- Medical Clinics: Health Centre and Pharmacy land uses within the village centre

13.4.1 Link Road

A link road between the R680 and R681 is proposed with access to the development. The proposed link road cross sections and details of junctions will be developed and confirmed as part of the planning process. The proposed link road will reduce any impacts on the existing R680 / Amberhill junction due to traffic generated by the proposed development.

Figure 13.2 – Proposed Road Layout



The Car and Bicycle parking quantum proposed are detailed in the sections below.

13.4.2 Car Parking

The determination of Car Parking provision for the residential and non-residential uses were based on the rates found in the "Waterford City and County Development Plan 2022-2028".

The rationale for the application of car parking standards is to ensure that consideration is given to the accommodation of vehicles in assessing development proposals while being mindful of the need to promote a shift towards more sustainable forms of transport.

The Waterford City and County Development Plan car parking standards are outlined in Volume 2: Development Management Standards, subsection 7- Parking Standards.

The required and proposed car parking spaces for the proposed development have been discussed and detailed in the sub sections below. Additionally, it is imperative for all proposed developments to facilitate EV charging points and Accessible parking spaces for mobility impaired drivers. These spaces must be in accordance with WCC development plan. The WCC Development plan states the following:

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- A minimum of 1 EV charge point space per five car parking spaces (ducting for every parking space shall also be provided) is required for residential multi-unit development.
- A minimum of 5% of car parking spaces provided should be designed for disabled car parking.

13.4.2.1 Residential Use

In accordance with the Waterford City and County Development Plan 2022-2028, the car parking requirements for residential uses have been detailed in the Table 13.12 below.

Table 13.12 - Proposed Development Residential Parking Facilities

Land Use	Duration	Units	WCC Development Plan Standard	Required Parking Spaces	Proposed Parking Spaces
Apartments	Long Stay	48	1 space per unit	48	60
	Short Stay (Visitor)		1 space per 4 units	12	
Total Residential Parking				**60**	**60**

Based on the rates mentioned above the required and proposed EV charging points and Accessible parking spaces are as follows:

- The required no. of EV Charging spaces is 12. The proposed development will also facilitate 12 no. of EV charging points which is in accordance with the WCC standard.
- The required no. of accessible spaces is 3. The proposed development will facilitate 6 no. of accessible spaces which is 3 spaces more than the recommended minimum.

It is noted that the proposed development will facilitate a total of 60 no. car parking spaces inclusive of 12 no. of EV charging points and 6 no. of accessible spaces for residential use which is in accordance with the WCC development plan.

13.4.2.2 Non-Residential Use – Village Centre

In accordance with the Waterford City and County Development Plan 2022-2028, the car parking requirements for non-residential uses in the village centre have been detailed in Table 13.13 below.

Table 13.13 - Proposed Development Village Centre Parking Facilities

Land Use	Units	WCC Development Plan Standard	Required Parking Spaces	Proposed Parking Spaces
Community Centre	120 seats	1 per 10 seats	12	173

Land Use	Units	WCC Development Plan Standard	Required Parking Spaces	Proposed Parking Spaces
MUGA	1 court	2 per court, 5 per 100 sqm	2	
Retail	602 sqm	1 per 50 sqm net floor space	12	
Café	150 sqm	1 per 30 sqm net floor area	5	
Gym	700 sqm, 6 staff	1 space per 50 sqm, + 0.5 space per staff member	17	
Health Centre	8 cons. Room, 12 staff	2 per consulting room & 1 per employee.	28	
Offices	306 sqm	1 per 50 sqm gross floor area	6	
Pharmacy	195 sqm	1 per 50 sqm net floor space	4	
Creche	178 children, 30 staff	1 per employee & dedicated set down area, and 1 per 4 children	74	
Supermarket	1,508 sqm	1 per 50 sqm net floor space.	30	
Warehouse A	780 sqm	1 per 100 sqm gross floor area	8	
Warehouse B (Office Use)	352 sqm	1 per 50 sqm gross floor area	7	
Total Non- Residential Parking Spaces			**205**	**173**

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Based on the table above, it Is observed that proposed development will facilitate 85% of the total required spaces i.e., 173 spaces of the total 205 required spaces. This is due to the close proximity to bus stops, improved pedestrian & cycling infrastructure and residential areas. The parking spaces across masterplan can also be shared which allows additional spaces to be put to use for pedestrians and open space.

The required and proposed EV charging points and Accessible parking spaces are provided in accordance with WCC development plan and they are as follows:

- The required no. of EV Charging spaces is 41 which is 20% of the required spaces. Similarly, the proposed development also facilitates 37 no. of EV charging points which is 20% of the proposed parking spaces.
- The required no. of accessible spaces is 10 which is 5% of the required spaces . Similarly, the proposed development provides 9 no. of accessible spaces which is also 5% of the proposed parking spaces.

In total, 173 no. of car parking spaces inclusive of 37 EV charging points and 9 no. of accessible car parking spaces will be facilitated for non-residential use in the village centre.

13.4.2.3 Non-Residential Use – Technology Park

According to the Waterford City and County Development Plan 2022-2028, Table 13.14 below outlines the car parking requirements for non-residential uses in the technology park.

Table 13.14 - Proposed Development Technology Park Parking Facilities

Land Use	Units	WCC Development Plan Standard	Required Parking Spaces	Proposed Parking Spaces
Warehouse 1	4600 sqm	1 per 100 sqm gross floor area	46	208
Warehouse 2 (Office Use)	1000 sqm	1 per 50 sqm gross floor area	20	
Total Non- Residential Parking Spaces			**66**	**208**

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As per the table above, it is noted that 208 no. of spaces will be facilitated in the technology park which is 142 spaces more than the required. These spaces will not only serve warehouses but ICT buildings and Energy Centre buildings proposed within the technology park.

- The proposed development will facilitate 40 no. of EV charging points which is 20% of the proposed parking spaces.
- The proposed development will facilitate 21 no. of accessible parking spaces which is 10% of the proposed parking spaces.

In total, 208 no. of car parking spaces inclusive of 40 EV charging points and 21 no. of accessible car parking spaces will be facilitated for non-residential use in the technology park.

13.4.2.4 Summary – Car Parking

Overall, the proposed development will facilitate a total of 441 car parking spaces inclusive of 89 EV charging points and 36 accessible spaces. This exceeds the required 331 car parking spaces including 53 EV charging points and 13 accessible parking spaces. Specifically, the proposed development provides 110 more car parking spaces, 36 more EV charging points, and 23 more accessible spaces than required.

The improved pedestrian and cycling infrastructure, proximity to bus stops and residential areas reduces the overall need for parking spaces. However, the proposed masterplan development will facilitate for shared car parking spaces across various land uses allowing efficient use of space and ensuring that the proposed development meets the standards set by the Waterford City and County (WCC) development plan 2022-2028.

13.4.3 Cycle Parking

The Bicycle Parking provision for the residential and non-residential uses were determined with consideration of the "Waterford City and County Development Plan 2022-2028". The Waterford City and County Development Plan bicycle parking standards are outlined in Volume 2: Development Management Standards, subsection 7- Parking Standards.

The Bicycle parking facilities for the proposed development should consider the following:

- Secure cycle compounds/bicycle parking racks to be provided where feasible.
- Cyclists should be able to secure both frame and wheels to the cycle parking stand.
- Cycle parking facilities shall be conveniently located, secure, easy to use, adequately lit and well posted.
- Parking should be placed within a populated, well-supervised area, and monitored by CCTV where possible.

- All long-term (more than three hours) cycle racks shall be protected from the weather.

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The required and proposed car parking spaces for the proposed development have been discussed and detailed in the sub sections below.

13.4.3.1 Residential Use

In accordance with the Waterford City and County Development Plan 2022-2028, the bicycle parking requirements for residential uses have been detailed in Table 13.15 below.

Table 13.15 - Proposed Development Residential Cycle Parking Facilities

Land Use	Duration	Units	WCC Development Plan Standard	Required Parking Spaces	Proposed Parking Spaces
Apartments	Long Stay	48	1 space per unit (min 2 spaces)	48	60
	Short Stay (Visitor)		1 space per 5 units (min 2 spaces)	10	
Total Residential Parking				**58**	**60**

It is noted that the proposed development will facilitate a total of 60 no. bicycle parking spaces for residential use which is 2 no. spaces more than the required parking spaces as per WCC development plan. These bicycle parking spaces will feature Sheffield-type stands and will be covered to shield bicycles from adverse weather conditions.

13.4.3.2 Non-Residential Use – Village Centre

In accordance with the Waterford City and County Development Plan 2022-2028, the bicycle parking requirements for non-residential uses in the village centre have been detailed in Table 13.16 below.

Table 13.16 - Proposed Development Village Centre Cycle Parking Facilities

Land Use	Units	WCC Development Plan Requirements		Required Parking Spaces			Proposed Parking Spaces
		Long Stay	Short Stay	Long Stay	Short Stay	Total Spaces	
Community Centre	837 sqm GFA & 20 staff	1 per 5 staff	1 per 100 sqm GFA	4	8	12	105
MUGA	1 court	1 per 5 staff	4 per court	0	4	4	
Retail	602 sqm GFA & 12 staff	1 per 5 staff	1 per 100 sqm GFA	3	6	9	
Café	150 sqm PFA & 5 staff	1 per 5 staff	1 per 100 sqm PFA	1	1	2	

Land Use	Units	WCC Development Plan Requirements		Required Parking Spaces			Proposed Parking Spaces
		Long Stay	Short Stay	Long Stay	Short Stay	Total Spaces	
Gym	914 sqm GFA	1 per 5 staff	1 per 100 sqm GFA	2	9	11	
Health Centre	8 rooms & 20 staff	1 per 5 staff	1 per 2 consulting rooms	4	4	8	
Offices	306 sqm GFA	1 per 200 sqm GFA	1 per 200 sqm GFA	2	2	4	
Pharmacy	195 sqm GFA & 10 staff	1 per 5 staff	1 per 100 sqm GFA	2	2	4	
Creche	160 child & 30 staff	1 per 5 staff	1 per 10 children	6	16	22	
Supermarket	1508 sqm GFA & 20 staff	1 per 5 staff	1 per 100 sqm GFA	4	15	19	
Warehouse A	780 sqm GFA	1 per 200 sqm GFA	1 per 500 sqm GFA	4	2	6	
Warehouse B (Office Use)	352 sqm GFA	1 per 5 staff	1 per 100 sqm GFA	2	2	4	
Total Non-Residential Parking				**34**	**71**	**105**	**105**

Note: GFA = Gross Floor Area and PFA = Public Floor Area

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It is noted that the proposed development will facilitate a total of 105 no. bicycle parking spaces for non-residential use in the village centre which is equal to the required parking spaces as per WCC development plan. These bicycle parking spaces will feature Sheffield-type stands and will be covered to shield bicycles from adverse weather conditions.

13.4.3.3 Non-Residential Use - Technology Park

The Table 13.17 below highlights the overall bicycle parking requirements for non-residential use in the technology park. The technology park consists of warehouses, ICT buildings and energy centre buildings.

Table 13.17 - Proposed Development Technology Park Cycle Parking Facilities

Land Use	Units	WCC Development Plan Requirements		Required Parking Spaces			Proposed Parking Spaces
		Long Stay	Short Stay	Long Stay	Short Stay	Total Spaces	
Technology Park (Warehouse)	5600 sqm GFA	1 per 200 sqm GFA	1 per 500 sqm GFA	28	11	39	102
Total Non-Residential Parking				**28**	**11**	**39**	**102**

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It is noted that the proposed development will facilitate a total of 102 no. bicycle parking spaces for non-residential use in the technology park which is 63 no. spaces more than the required parking spaces as per WCC development plan. These spaces will serve all the elements within the technology park including ICT buildings and energy centre buildings. These bicycle parking spaces will feature Sheffield-type stands and will be covered to shield bicycles from adverse weather conditions.

13.4.3.4 Summary – Bicycle Parking

Overall, the proposed masterplan development will facilitate a total of 267 no. of bicycle parking spaces. This exceeds the required 202 no. bicycle parking spaces by a margin of 65 spaces. These spaces are distributed across the masterplan lands serving residential area, non- residential facilities in the village centre and the technology park, which includes warehouse, ICT buildings and energy centre buildings. All proposed bicycle parking spaces will feature Sheffield-type stands and will be covered to protect bicycles from adverse weather conditions. This comprehensive provision ensures ample parking for residents, visitors, and employees, promoting sustainable transportation within the development.

13.5 Potential Impacts of the Proposed Development

13.5.1 Construction Phase

The transport effects of the proposed development during the construction phases are considered through the following key transportation issues;

- Vehicle routing;
- construction traffic impacts;

It is assumed that all construction traffic will approach the site from the N25 corridor. During the construction of the proposed development there is the potential for temporary local disruption to pedestrian, cyclists, and vehicular traffic users along the Amberhill Road. The vehicle routing and construction traffic estimated is discussed in the sections below.

13.5.1.1 Site Access and Car Parking

During the construction stage, the existing vehicular access along Amberhill road to be utilised for both Heavy Vehicles and staff vehicles. It is envisaged that all the Heavy Vehicles will be using the access during non-peak hours. The parking arrangements for the staff will be provided within the proposed construction compound. Parking alongside roads will strictly be prohibited.

13.5.1.2 Potential Impacts- Construction Phase

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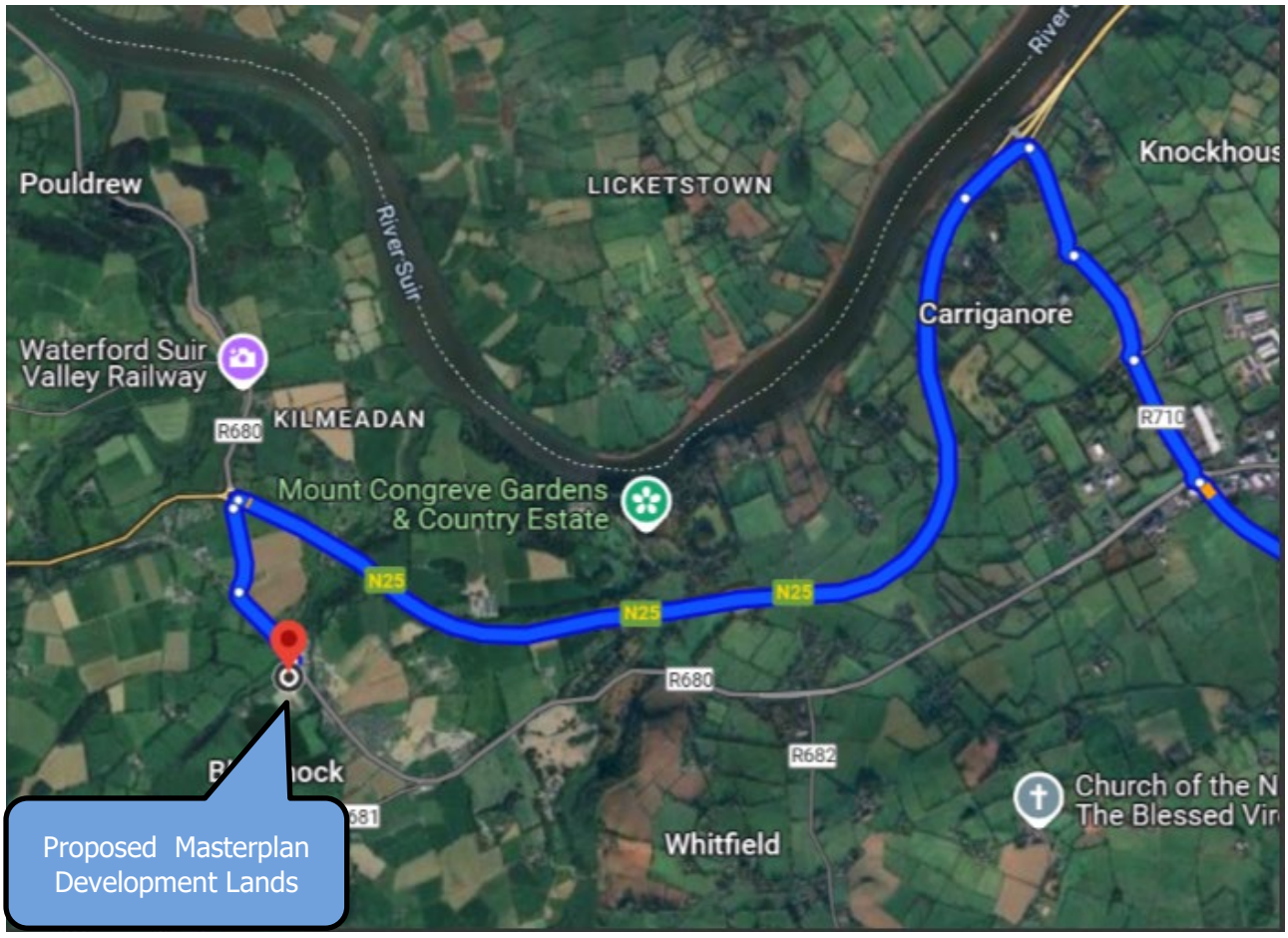
During the network peak hours, construction trips are expected to be lower than operational trips. Therefore, no separate analysis of the road network adjacent to the proposed development is required. However, a separate analysis was undertaken for the N25 Bypass and R680 concerning the construction trips. To assess the potential impacts of the trips associated with the construction phase, the following steps were utilised:

- Identification of the potential route to be used for material delivery and staff trips;
- Determining the baseline traffic for the major links to be used;
- Existing Capacity Analysis;
- Prediction of trip generation; and
- Determination of the impacts of the trips.

13.5.1.3 Identification of Major Route for Staff and Material Delivery

The final construction routes are to be determined by the contractor once materials have been sourced and sites for material deposition. This is to be included in the construction traffic management plan upon appointment. However, a proposed route has been determined for the purposes of this assessment with the primary intention of avoiding heavily congested areas. As a result, the following haul routes are proposed for the construction period as shown in the Figure 13.2 below.

Figure 13.3 - Proposed Haul Route for HGV's



Staff Trips Route

While some staff may commute locally from Kilmeaden, the majority will arrive either via N25 Bypass or R680 road. Staff trips originating from Waterford will be directed through R680 road. Since the majority of staff trips are expected to occur outside of peak hours (discussed in sections below), they will avoid congestion within the town centre. The staff trips route originating from Waterford is illustrated in Figure 13.3 below.

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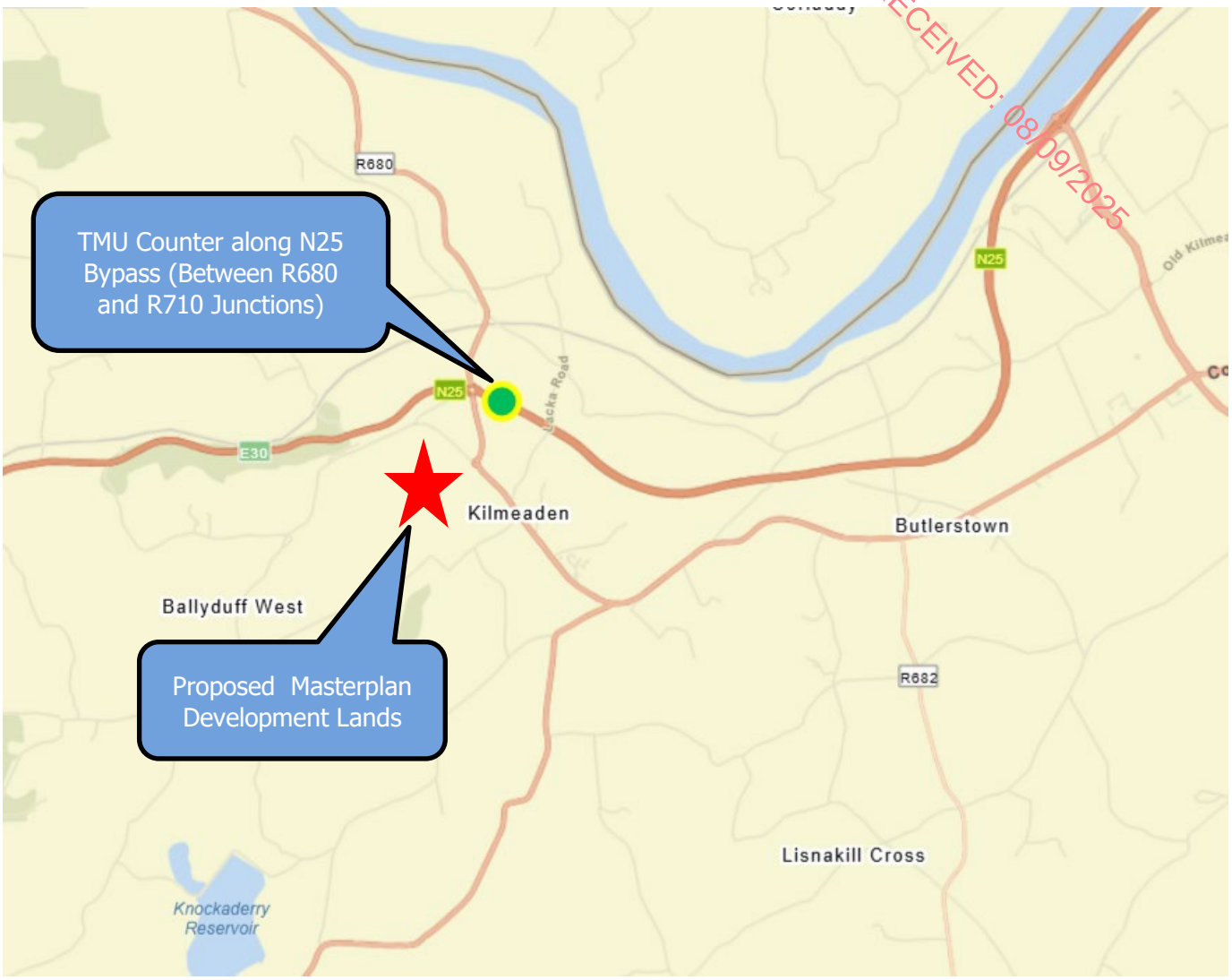
Figure 13.4 - Majority Staff Trips Originating from Waterford



13.5.1.4 Baseline Traffic for Construction Traffic

The baseline traffic for the analysis was obtained from the TII Traffic Monitoring Unit (TMU) counters, which are accessible on https://trafficdata.tii.ie/publicmultinodemap.asp. Data for the year 2024 was utilised for the analysis. Figure 13.4 below illustrates the locations of the Traffic Monitoring Units (TMU) from which data was extracted for analysis.

Figure 13.5 - Location of the TMU Counter for the Analysis



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13.5.1.5 Existing Capacity Analysis

The existing capacity analysis of the link were analysed in accordance with the guidelines provided in the Design Manual for Roads and Bridges, specifically Volume 5, Section 1, Part 3, titled 'Traffic Capacity of Urban Roads' (published in May 1999).

According to this document, the category of the link and the corresponding 2-way capacity are summarised below:

- N25 Bypass (Urban Motorway (UM)) - 8,000 vehicles per hour.

13.5.1.6 Trip Generation: Construction Phase

Following working hours are proposed for the construction:

- Monday to Saturday – 7 am to 7 pm
- No work on Sunday and Public Holidays

Based on the above schedule, the following sub-section summarizes the estimation of the number of daily staff and material delivery trips.

Staff traffic

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- At the peak of construction, it is anticipated that up to 750 construction workers will be required at the proposed development.
- A car ownership rate of 1.5 was assumed, with a mode share for cars estimated at 100%.
- Based on these assumptions, a total of 500 car trips by construction staff has been calculated.
- Since the working hours are between 7 am to 7 pm, the majority of the staff will arrive before 7 am and depart after 6 pm. Therefore, the following percentage arrival and departure distribution is assumed for staff.
  - 70% of the staff will arrive between 6 am and 7 am.
  - 15% of the staff will arrive between 7 am and 8 am.
  - 15% of the staff will arrive between 8 am and 9 am.
  - 15% of the staff will depart between 5 pm and 6 pm.
  - 15% of the staff will depart between 6 pm and 7 pm.
  - 70% of the staff will depart between 7 pm and 8 pm

Based on the above assumptions, Table 13.18 below summarises the number of staff trips for various hours.

Table 13.18 - Staff Trips by Hour

Time	Arrivals/ Departures	Percentage	Trips
6 to 7 am	Arrivals	70%	350
7 to 8 am	Arrivals	15%	75
8 to 9 am	Arrivals	15%	75
5 to 6 pm	Departures	15%	75
6 to 7 pm	Departures	15%	75
7 to 8 pm	Departures	70%	350

Material Deliveries

Based on the feedback received from the client the construction of the proposed development is predicted to result in an additional 120 Heavy Goods Vehicles (HGV's) for the purpose of material delivery to the development site.

Net Construction Traffic

The summary of total construction trips is summarised in Table 13.19 below.

Table 13.19 - Net Construction Trips

Time Period	Staff Trips		Material Trips	
	Arrival	Departure	Arrival	Departure
AM Peak (8 to 9am)	75	0	0	0
PM Peak (5 to 6pm)	0	75	0	0
Off Peak	425	425	120	120
Total	500	500	120	120
24 hr Total	**1000 two-way trips**		**240 two-way trips**	

13.5.1.7 Construction Trips Impact Analysis

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Based on the staff arrival and departure times, as well as material delivery times mentioned above, an analysis of the existing capacity for the N25 Bypass (Carrick Road Roundabout) was conducted for the following hours on weekdays and Saturday.

- Staff arrival time: 6 to 9 am
- Staff departure time: 5 to 8 pm.
- Material delivery: As previously mentioned, material delivery will be restricted to the off-peak period between 10 am and 4 pm. For the analysis, a single hour with peak background traffic on the N25 Bypass (Carrick Road Roundabout) during this period was considered. Additionally, for Saturdays, a single peak hour between 7 am and 7 pm was analysed.

Based on that, the impact on the N25 Bypass (Carrick Road Roundabout) is summarised in Table 13.20 below.

Table 13.20 - Traffic Impact on N25 Bypass (Carrick Road Roundabout) during Construction Phase

Section	Capacity (Veh/hr)	Time Period	Existing Trip	Existing Flow / Capacity	Construction Trips	Cumulative Flow	Cumulative Flow / Capacity
N25 Bypass (Carrick Road Roundabout)	8000	6 to 7 am	385	5%	350	735	9%
		7 to 8 am	770	10%	75	845	11%
		8 to 9 am	788	10%	75	863	11%
		Off-peak period	902	11%	240	1142	14%
		5 to 6 pm	935	12%	75	1010	13%
		6 to 7 pm	594	7%	75	669	8%
		7 to 8 pm	365	5%	350	715	9%
		Saturday	688	9%	350	1038	13%

Based on the above table, it is noted that the N25 Bypass (Carrick Road Roundabout) have sufficient capacity to accommodate construction trips. The cumulative flow-to-capacity ratio is noted to be less than 15%, indicating that the impact of the construction trips would be ***"Slight and Not significant"***. Additionally, the impact of the construction traffic is expected to be ***short-term.***

13.5.1.8 Cumulative Construction Trips Impact

No cumulative traffic impact is anticipated during the construction phase.

13.5.2 Operational Phase

13.5.2.1 Trip Generation and Distribution

13.5.2.1.1 Mode Share

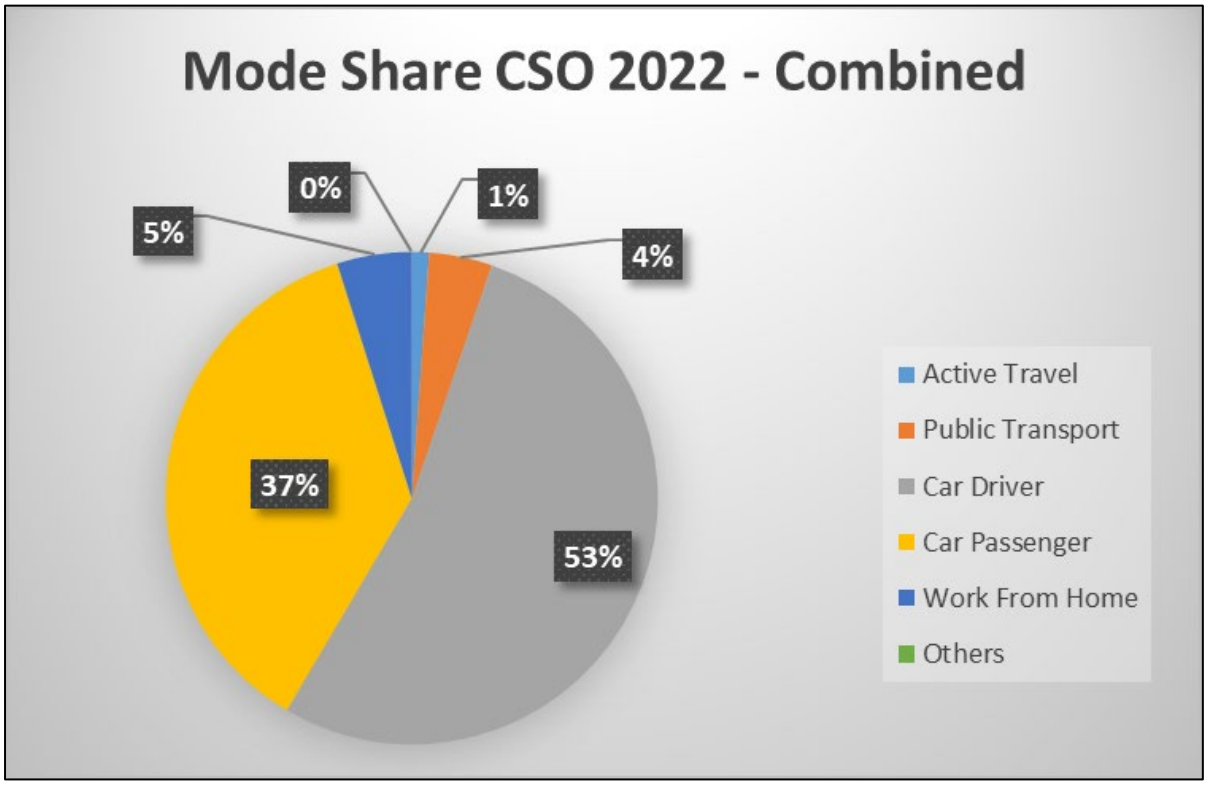
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An analysis of the Central Statistics Office's SAPMAP (Small Areas Population Map) data was conducted to understand travel trends within the vicinity of the proposed development. The study encompassed the entire town of Kilmeaden, focusing on commuting patterns for work, school, and college. The data revealed the estimated percentages of various travel modes used by the population. These findings are detailed in Table 13.21 and Figure 13.5 below.

Table 13.21 – CSO Data 2022: Kilmeaden Mode Share

Mode	Work	Education	Combined
Active Travel	0%	3%	1%
Public Transport	0%	10%	4%
Car Driver	**88%**	**5%**	**53%**
Car Passenger	4%	82%	37%
Work From Home	8%	0%	5%
Others	0%	0%	0%
Total	100%	100%	100%

Figure 13.6 CSO Data 2022: Mode Share Combined



13.5.2.1.2 Trip Rates

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The trip rates for various land uses within the proposed development are calculated by taking the multimodal trip rates from the TRICS (Trip Rate Information Computer System) database. This gives the total number of trips generated per unit regardless of transport mode.

Vehicular trip rates have been utilised for non-residential land uses within the proposed development. However, for residential land use (i.e., apartments) vehicular trip rates were estimated by taking the multimodal person trip rates and multiplying the percentage modal split of car drivers estimated through CSO data.

The detailed output of the TRICS database is summarised in Appendix 13.2, while Table 13.22 below summarises the trip rates per unit for the proposed development during peak hours.

Table 13.22 – TRICS Database: Trips Rates for Proposed Development

Land Use	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Arrival	Departure	Arrival	Departure
Residential Use				
Apartment	0.125	0.378	0.290	0.209
Non- Residential Use – Village Centre and Technology Park				
Community Centre	1.245	0.166	2.137	1.350
Retail (Commercial)	1.623	0.050	0.126	1.737
Café	1.373	0.980	2.105	2.895
Gym	33.333	28.070	75.439	77.193
Medical Clinics	1.942	0.000	0.324	1.942
Offices	1.623	0.050	0.126	1.737
Creche	1.360	1.040	0.640	0.880
Supermarket	2.299	1.700	3.074	2.963
Warehouses	0.021	0.021	0.017	0.029
ICT buildings	N/A	N/A	N/A	N/A
Energy Centre	0.067	0.040	0.029	0.060

To estimate the vehicular trips for ICT (Information Communication and Technology) buildings certain assumptions were made which have been discussed in the section below.

13.5.2.1.3 Trip Generation

ICT Trips and Internal Trip Assumptions

ICT Buildings

The trips for ICT buildings have been estimated based on the following assumptions:

- The operational stage of the ICT buildings will accommodate approximately 100 staff/employee.
- A car ownership rate of 1 and 100% mode share by car is taken
- 3 HGV's will be utilised for the delivery of materials.

- 30% of staff trips and 100% of delivery trips will be made during the peak hour.

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It is estimated that 100 PCU's for staff trips and 6 PCU's for delivery trips will be made to and from the proposed development. The arrival and departure time profile for staff and delivery trips are as follows:

- 07:00-08:00 AM: 70 PCUs staff trips and 0 Delivery trips
- 08:00-09:00 AM: 30 PCUs staff trips and 6 Delivery trips
- 04:00-05:00 PM: 30 PCUs staff trips and 6 Delivery trips
- 05:00-06:00 PM: 70 PCUs staff trips and 0 Delivery trips

Based on the above time profile the estimated ICT buildings vehicular trips for operation stage during peak hours is summarised in Table 13.23 below.

Table 13.23 - Estimated Vehicular Trips for ICT Buildings

Type	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Arrival	Departure	Arrival	Departure
ICT Buildings	36	6	6	36

Internal Trips

The close proximity of the commercial/enterprise (non-residential use) development within the masterplan lands to the residential development in the Kilmeaden village facilitates a "live-work" arrangement. To take account for this, 20% of trips utilised by non-residential/commercial uses will be external whereas the remaining 80% of those trips will be converted to sustainable walking/cycling trips and linked trips between the residential and non-residential/commercial areas of the Kilmeaden masterplan lands

The following reductions have been applied to the land uses for non-residential/commercial development:

- For Community centre, Gym and Retail (Commercial Units), all trips are assumed to be internal
- For Offices, Café, Medical Clinics, Supermarket and Creche, 20% of trips are assumed to be external.

Vehicular Trip Estimation

Using the trip rates estimated by the TRICS database and applying the trip reductions to non-residential land uses in the proposed development, the total number of vehicular trips attributed to the proposed development is summarised in Table 13.24 below.

Table 13.24 – Vehicular Trips based on Trip rates from TRICS Database

Land Use	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Arrival	Departure	Arrival	Departure
Residential Use				
Apartment	6	18	14	10
Non- Residential Use – Village Centre and Technology Park				
Community Centre	0	0	0	0
Retail (Commercial)	4	3	2	2
Café	7	5	9	9

Land Use	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Arrival	Departure	Arrival	Departure
Gym	3	0	0	3
Medical Clinics	0	0	0	0
Offices	0	0	1	1
Creche	1	0	0	1
Supermarket	1	1	1	2
Warehouses	0	0	0	0
ICT buildings	36	6	6	36
Energy Centre	2	1	1	2
Total	**61**	**35**	**34**	**66**

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13.5.2.1.4 Trip Distribution and Assignment

The above trips were distributed through the network based on the existing travel patterns in the area as obtained from the junction turning counts. This was achieved by taking the existing volumes entering and exiting the site currently and distributing the proposed trips outwards from this point based on the proportion of turning movements at each junction thereafter. The findings of the trip distribution are provided within Appendix 13.1.

The access and egress percentage split for access junctions is summarised in Table 13.25 below. These splits were estimated under the assumption that the majority of trips during peak hours will be directed towards Waterford, given the direct route via R680 from Kilmeaden village. These splits were determined by referencing traffic movements at Junction 5 (R680/R681 Priority Junction) and consequently applying percentage access split with significant traffic proportion arriving and departing towards Waterford.

Table 13.25 – Proposed Development Access Split Percentage

Zones	Movement	Access Split Percentage	
		AM Peak (08:00 – 09:00)	PM Peak (17:00 – 18:00)
From R680 West	All Development Traffic arriving from the direction of Carrick Road Roundabout	31%	38%
From R680 East	All Development Traffic arriving from the direction of Waterford	69%	62%
To R680 West	All Development Traffic departing towards the direction of Carrick Road Roundabout	30%	41%
To R680 East	All Development Traffic departing towards the direction of Waterford	70%	59%

Approximately a percentage split of 30% & 70% in the AM Peak and 40% & 60% in the PM Peak have been estimated for the distribution of development traffic via proposed access junction.

13.5.2.1.5 Committed Development

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The relevant permitted development that have been granted planning permission in the vicinity of the proposed development that will result in additional traffic at key junction is as follows:

- Ref 21214: the construction of 96 no. dwelling units consisting of 42 two-storey, 4-bedroom detached and semi – detached houses, 38 two-storey, 3-bedroom semi-detached houses, and 16 two-storey, 2-bedroom apartments along with bin and bicycle stores, vehicular and pedestrian entrances and all associated site development works.

Trip Generation and Distribution

The trips utilised for the assessment were based on the impact assessment document submitted to the council as part of the planning application. Table 13.26 below summarises the committed Development Peak Hour traffic utilised.

Table 13.26 - Committed Development Trips (Ref Application: 21214)

Type	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Arrival	Departure	Arrival	Departure
Committed Development	37	80	62	36

Similar to the traffic distribution of the proposed development, the committed development trips were also distributed through the network based on the existing travel patterns in the area as obtained from the junction turning counts.

13.5.2.2 Initial Screening Assessment

As part of the initial screening assessment, additional volumes due to the proposed development at each of the 6 no. key junctions identified previously above was assessed. In line with TII's Traffic and Transport Assessment Guidelines, junctions are only assessed in detail if:

- Development traffic exceeds 10% of turning movements at junctions.
- Development traffic exceeds 5% of turning movements at junctions if location has potential to become congested or sensitive.

For this assessment, all sites are subject to a 10% threshold, as the proposed development in Kilmeaden village is not considered sensitive.

Table 13.27 shows the percentage increase in traffic at each junction as a result of traffic generated by the proposed development.

Table 13.27 - Percentage Impact of Development Traffic From Proposed Development at Junctions

Junction	Existing Volume	Development Trips	% Increase
AM Peak			
Junction 1	1955	24	1%
Junction 2	1212	28	2%
Junction 3	1165	30	3%

Junction	Existing Volume	Development Trips	% Increase
Junction 4	1172	97	8%
Junction 5	1319	67	5%
Junction 6	1504	60	4%
PM Peak			
Junction 1	1825	31	2%
Junction 2	1005	38	4%
Junction 3	974	41	4%
Junction 4	970	102	11%
Junction 5	1180	61	5%
Junction 6	1347	52	4%

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From the table above, it's clear that the additional trips due to the proposed development surpassed the 10% threshold only at Junction 4 (R680/Amberhill Road Junction), which is the closest sensitive junction to the proposed development access road. Consequently, Junction 4 was selected for a detailed assessment. The proposed link road and connecting junctions will be designed to accommodate the estimated traffic and would not need to be modelled based on the percentage increases highlighted in Table 13.27 above.

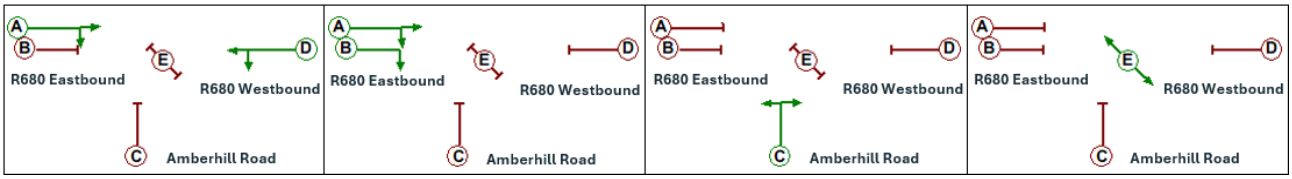
13.5.2.3 Traffic Impact Analysis

As outlined in the previous section, Junctions 4 was selected for a detailed assessment. The existing Junction 4 (R680/Amberhill Road Junction) is a priority controlled junction, however as part of the assessment it is recommended to upgrade it to a signalised junction. Therefore, Junction 4 was analysed using JCT LINSIG software. The direct output of the modelled junction as obtained from the software is included in Appendix 13.3. A summary of the analysis is provided in the following sub-section.

13.5.2.3.1 Junction 4 (R680/Amberhill Road Junction) - Proposed Development

The stage sequence diagram for the signalised junction is summarised in Figure 13.6 below.

Figure 13.7 Signalised Junction Stage Sequence Diagram



The stage sequence and assumptions for the junction analysis are summarised below:

- Stage 1: R680 arm receives a general green signal, allowing right-turning traffic from R680 Eastbound movement to proceed into gaps if there is no conflicting traffic from R680 Westbound arm.
- Stage 2: If there are insufficient gaps for right-turning traffic from R680 Eastbound arm, Stage 2 initiates an early cut-off of Stage 1. In this stage, all movements along R680 Eastbound arm are provided right of way. This stage is typically called on demand but has been modelled to occur every cycle.
- Stage 3: Amberhill Road arm receives a green signal.

- Stage 4: All-red stage for vehicles, while pedestrians/cyclists are provided a green signal to cross. This stage is also typically called on demand, however modelled to be called every cycle.
- Since the existing junction is priority controlled, no signal data is available. Hence, based on the Traffic Signs Manual by the Department of Transport UK, a minimum green time of 7 seconds is provided for all phases.
- The green time for pedestrians is determined based on a 10-second green signal, an amber phase equal to the crossing width of the road divided by 1.2 m/s, and a 2-second red phase before traffic regains priority. This is based on Traffic Advisory Leaflet 5/054, issued by the Department of Transport UK.
- The intergreen time between other stages is calculated based on guidelines provided in Traffic Advisory Leaflet 1/06: General Principles of Traffic Control by Light Signals, issued by the Department of Transport UK.
- The junction analysis was conducted with a 120-second cycle time.

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Table 13.28 below displays the junction assessment results for the proposed development traffic for all assessment years.

Table 13.28 - Junction Modelling Results for Junction 4

Arm	Proposed Development Trip Analysis			
	MMQ	Delay	DOS	PRC
Opening Year (2029) – AM Peak				
R680 Eastbound	16 pcu	14 sec	63%	41%
Amber Hill Road	3 pcu	1 min 30 sec	62%	
R680 Westbound	8 pcu	16 sec	40%	
Opening Year (2029) – PM Peak				
R680 Eastbound	6 pcu	10 sec	33%	56%
Amber Hill Road	3 pcu	1 min 22 sec	58%	
R680 Westbound	13 pcu	19 sec	55%	
Opening Year+5 (2034) – AM Peak				
R680 Eastbound	18 pcu	15 sec	67%	34%
Amber Hill Road	4 pcu	1 min 32 sec	64%	
R680 Westbound	9 pcu	16 sec	42%	
Opening Year+5 (2034) – PM Peak				
R680 Eastbound	6 pcu	10 sec	34%	41%
Amber Hill Road	4 pcu	1 min 32 sec	64%	
R680 Westbound	14 pcu	19 sec	57%	
Opening Year+15 (2044) – AM Peak				
R680 Eastbound	21 pcu	17 sec	73%	23%
Amber Hill Road	4 pcu	1 min 36 sec	68%	
R680 Westbound	10 pcu	17 sec	45%	
Opening Year+15 (2044) – PM Peak				
R680 Eastbound	7 pcu	10 sec	37%	37%
Amber Hill Road	4 pcu	1 min 34 sec	66%	
R680 Westbound	16 pcu	20 sec	62%	

Based on the above table, maximum queues and delays of less than 25 pcus and 100 seconds are recorded across all arms. Similarly, maximum DOS of less than 75% and PRC of around 55% is observed for all arms. This analysis suggests that the junction is operating well below the normal saturation level of 90% (defined for LINISG software) indicating stable and efficient flow condition. Additionally, it will also have

sufficient capacity to cater for future traffic volumes from the proposed development. Therefore, the impact of the future traffic from the proposed development was considered to be *'Imperceptible'*.

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13.5.2.3.2 Junction 4 (R680/Amberhill Road Junction) - Cumulative Development

The Junction 4 (R680/Amberhill Road Junction) was analysed using JCT LINSIG software. The analysis included the trips from the nearby committed development (Ref 21214) and trips from the proposed development. Table 13.29 below displays the junction assessment results for cumulative assessment including both committed and proposed development for all assessment years.

Table 13.29 - Junction Modelling Results for Junction 4

Arm	Do Minimum				Do Something			
	MMQ	Delay	DOS	PRC	MMQ	Delay	DOS	PRC
Opening Year (2029) – AM Peak								
R680 Eastbound	16 pcu	13 sec	63%	43%	17 pcu	14 sec	65%	38%
Amber Hill Road	2 pcu	1 min 20 sec	39%		3 pcu	1 min 31 sec	63%	
R680 Westbound	8 pcu	15 sec	38%		9 pcu	16 sec	43%	
Opening Year (2029) – PM Peak								
R680 Eastbound	6 pcu	9 sec	33%	69%	6 pcu	10 sec	34%	41%
Amber Hill Road	1 pcu	1 min 12 sec	14%		4 pcu	1 min 32 sec	64%	
R680 Westbound	12 pcu	18 sec	53%		13 pcu	19 sec	56%	
Opening Year+5 (2034) – AM Peak								
R680 Eastbound	17 pcu	14 sec	66%	35%	19 pcu	15 sec	68%	31%
Amber Hill Road	2 pcu	1 min 21 sec	40%		4 pcu	1 min 33 sec	65%	
R680 Westbound	8 pcu	15 sec	40%		10 pcu	17 sec	45%	
Opening Year+5 (2034) – PM Peak								
R680 Eastbound	6 pcu	9 sec	35%	61%	7 pcu	10 sec	36%	41%
Amber Hill Road	1 pcu	1 min 12 sec	14%		4 pcu	1 min 32 sec	64%	
R680 Westbound	14 pcu	18 sec	56%		15 pcu	19 sec	59%	
Opening Year+15 (2044) – AM Peak								
R680 Eastbound	21 pcu	16 sec	72%	24%	22 pcu	17 sec	74%	20%
Amber Hill Road	2 pcu	1 min 23 sec	45%		4 pcu	1 min 37 sec	69%	
R680 Westbound	9 pcu	16 sec	43%		11 pcu	17 sec	48%	
Opening Year+15 (2044) – PM Peak								
R680 Eastbound	7 pcu	10 sec	38%	49%	7 pcu	10 sec	39%	37%

Arm	Do Minimum				Do Something			
	MMQ	Delay	DOS	PRC	MMQ	Delay	DOS	PRC
Amber Hill Road	1 pcu	1 min 12 sec	16%		4 pcu	1 min 34 sec	66%	
R680 Westbound	15 pcu	19 sec	61%		16 pcu	20 sec	64%	

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Based on the above table, for the Do minimum scenario the maximum queues and delays of less than 25pcus and 100 seconds were observed across all arms. The maximum DOS of less than 75% and PRC of around 70% was recorded for all arms. Similarly, for the Do something scenario the maximum queues and delays of less than 25pcus and 85 seconds were observed across all arms. The maximum DOS of less than 75% and PRC of around 45% was recorded for all arms. This analysis indicates that the junction is operating well below the normal saturation level of 90% (defined for LINISG software, Refer section 13.2.1.11) indicating stable and efficient flow condition. The inclusion of the proposed link road between the R680 and R681 will reduce the development traffic using the modelled R680 / Amberhill junction. The modelled scenario would be considered a worst case scenario. Therefore, the impact of the future traffic from all the nearby developments and proposed development was considered to be *'Imperceptible'*.

13.6 Mitigation Measures

13.6.1 Construction Phase

The contractor's detailed Construction Traffic Management Plan will address the following key issues:

- Maintaining free traffic flow along the local road networks.
- Ensuring all footpaths and road surfaces are always free from debris.
- Ensuring the efficient free flow of operatives entering and exiting the proposed development site.
- Managing the distribution flow of materials within the site and debris removal to maintain the required levels of productivity whilst achieving the high-quality standards expected.
- Plant and operative segregation during all stages of the proposed development.
- Robust traffic management principles and practices will need to be enforced to ensure construction traffic does not create congestion and cause inconvenience to the adjacent tenants and the public.
- Protection to the public for the duration of the project construction phase on all elevations.

All deliveries will be through N25 Bypass Carrick Road Roundabout. The contractor will develop a detailed Logistics Plan to identify the delivery schedule requirements for every delivery. It is anticipated that the contractor will operate a "Just in Time" delivery philosophy to minimise materials stored on site and reduce congestion in and around the works compound.

13.6.2 Operational Phase

Mobility Management Plan (MMP) will be developed to mitigate the anticipated increase in traffic volumes. Efforts will be made to utilise local public transport network, road network and active travel facilities in the most efficient ways possible that will be encouraged through appropriate cycle parking and storage facilities on the proposed development. Staff will be made aware about the public transport facilities nearby. The measure will also include making people aware about "Cycle to Work Scheme" and "Taxsaver Commuter Ticket Scheme".

13.7 Monitoring or Reinstatement Measures

13.7.1 Construction Phase

No monitoring requirements are necessary for the proposed development.

13.7.2 Operational Phase

No monitoring requirements are necessary for the proposed development.

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13.8 Residual Effects of the Proposed Development

13.8.1 Construction Phase

Through the implementation of the plans outlined in Section 13.6.1, it is anticipated that the construction traffic effects on both the local road network and on human beings will continue to be ***slight***, ***negative*** and ***short-term.***

13.8.2 Operational Phase

Through the implementation of the MMP outlined in Section 13.6.2 from early stages of the operational phase, it is anticipated that the effects of the proposed development both on the local road network and on human beings will continue to be ***neutral, imperceptible*** and ***long term.***

13.9 Cumulative Impacts of the Proposed Development

13.9.1 Construction Phase

The analysis conducted in Section 13.5.1 shows that the proposed development at Kilmeaden does not result in any cumulative impacts on the local or strategic road network during the construction phase.

13.9.2 Operational Phase

The analysis conducted in Section 13.5.2 shows that the proposed development at Kilmeaden results in ***'Imperceptible'*** cumulative impacts on the local or strategic road network during the operational phase.

13.10 References and Guidance Documents

The following is a list of sources of information consulted for use in this chapter:

- Transport Infrastructure Ireland (TII) Transport Assessment Guidelines (TII, 2014);
- The Design Manual for Urban Roads and Streets (DMURS) (DTTAS, 2013);
- Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG) – Unit 5.3 Travel Demand Projections;
- Waterford City and County Development Plan 2022-2028.

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Chapter 14 – Material Assets - Utilities

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14. MATERIAL ASSETS - UTILITIES

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14.1 Introduction

This chapter of the EIAR reports on the likely significant material asset effects to arise from the demolition and construction stage, the operation stage and the decommissioning of the proposed development.

The chapter describes the material assets utilities, policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely material assets effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

The Directive 2011/92/EU defines material assets as resources that are values and intrinsic to specific places, which can be of either human or natural origin.

This chapter undertakes an evaluation of the potential significant impacts that the proposed development may have on a range of utilities, which are defined as built services and infrastructure, roads and traffic, waste management and other valued resources that are intrinsic to specific places (EPA Guidelines 2022). Note that potential impacts associated with waste and traffic will be outlined in their relevant chapters.

The impact assessment presented in this chapter is designed to identify any potential impacts that have not been previously addressed in other sections of the EIA report. As utilities is only referred to in this chapter, it is essential to thoroughly evaluate the potential impacts of the proposed development on material assets – Utilities to ensure that any negative consequences can be minimised, mitigated, or avoided entirely.

14.2 Methodology

14.2.1 Relevant Legislation and Guidance Notes

The following legislation was referred to in preparing this impact assessment:

- EPA Guidelines 2022; on the Information to be contained in Environmental Impact Assessment Reports
- Advice Notes for Preparing Environmental Impact Statements (EPA, Draft September 2015);
- Advice Notes on Current Practices in the Preparation of Environmental Impact Statements (EPA 2003).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019).
- S.I No.652/2016- Waste Water Discharge (authorisation)(Environmental Impact Assessment) Regulation 2016.
- Water Services Guidelines for Planning Authorities Draft (Department of Housing, Planning and Local Government, 2018).
- S.I. No. 264/2013 - Electricity Regulation Act 1999 (Restricted Electrical Works) Regulations 2013
- Code of Practice For Avoiding Danger from Underground Services
- Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations 2013.

In this EIA report, the impacts on some of the material assets described in the above guidance have already been considered in the following chapters and therefore these aspects will not be addressed in specific detail within this chapter:

- Chapter 4 – Population and Human Health
- Chapter 5 – Land, Soils and Geology

- Chapter 6 – Hydrology & Hydrogeology
- Chapter 8 – Air Quality;
- Chapter 11 – Landscape and Visual Impact
- Chapter 12 – Archaeology, Architectural and Cultural Heritage
- Chapter 13 – Material Assets – Traffic and Transportation
- Chapter 15 – Material Assets – Waste Management

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This chapter assesses material assets which have not already been addressed elsewhere in this EIA report. The potential impacts, if any, are assessed in terms of the following:

- Land Use, Property and Access
- Power and Electrical Supply
- Telecommunications
- Surface Water Infrastructure
- Foul Drainage Infrastructure
- Water Supply

14.2.2 Sources of Information

This chapter has been prepared having regard to the following documents:

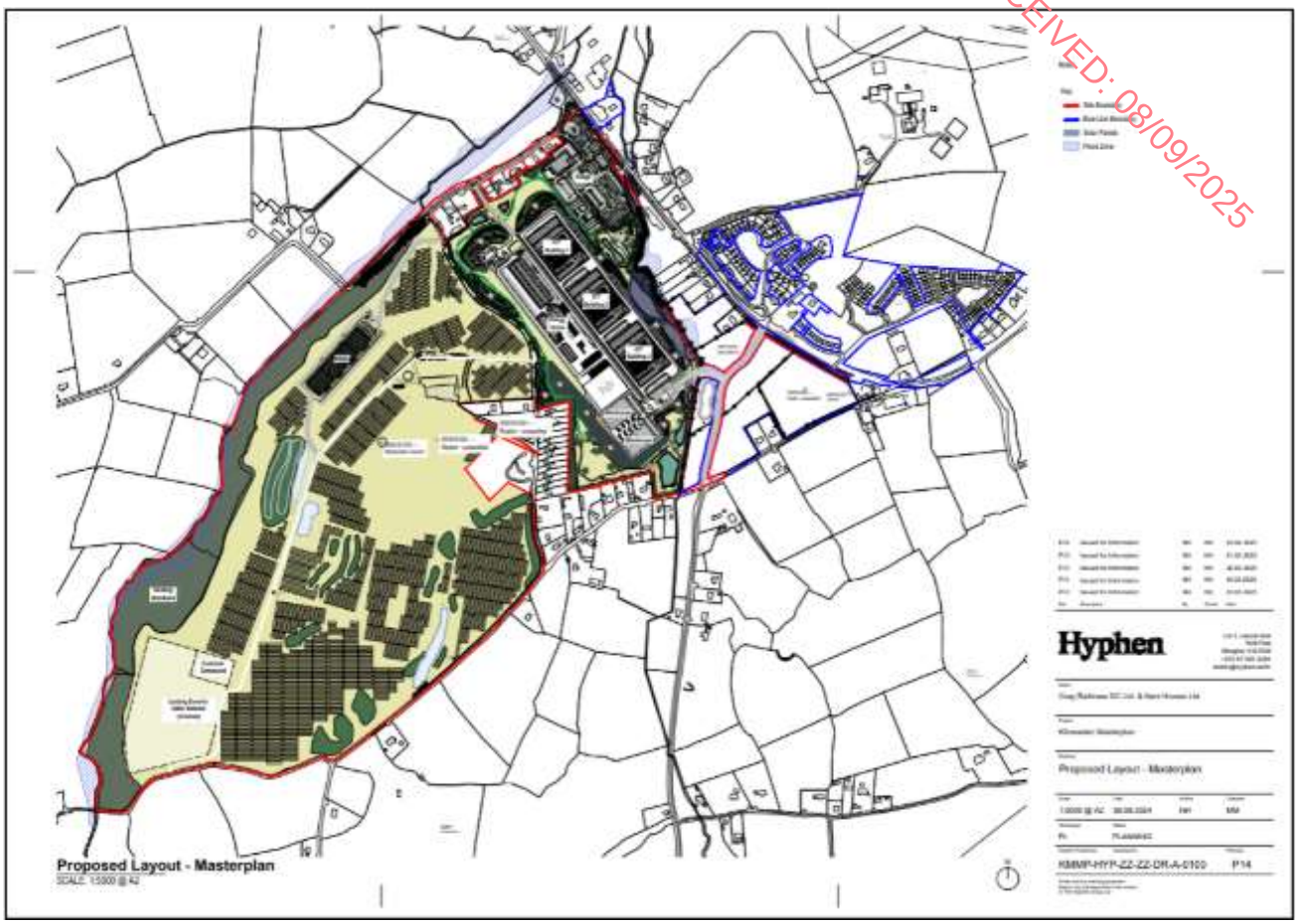
- Malone O' Regan Environmental Assessment Report 2009
- A range of design site plans and drawings, as submitted with this planning application.
- Atkins Realis Ireland Limited Engineering Report
- Atkins Realis Ireland Limited Stage 1 Flood Risk Assessment Report
- Atkins Realis Ireland Construction Environmental Management Plan
- Homan O' Brien Engineering excellence- Village Centre Mechanical & Electrical & Lift Plant Space Requirements
- Homan O' Brien Engineering excellence - Planning application energy statement
- Homan O' Brien Engineering excellence - Lighting impact assessment
- Glanbia PLC, Environmental Assessment Report.
- Design architects and engineer consultation

The assessment of impact on utilities has been undertaken by consultation with regard to availability with the utility supplier, ESB Networks, Telecommunication, and Uisce Éireann (UÉ). Mitigation measures are proposed where required. Further detail on consultation with utility suppliers are outlined within the relevant documentation supporting the planning application.

14.2.3 Forecasting Methods and Difficulties Encountered

In assessing the potential environmental impacts with regard to utilities for the proposed development, forecasting methods for utilities have been evaluated. The process involved comprehensive analyses to anticipate future demand and consumption patterns. Challenges encountered included variability in demand, such as the uncertainty of individual or commercial development that could significantly alter demand and technological advancements affecting energy efficiency and resource consumption. It is difficult to predict the exact impact the construction phase will have on utilities until construction methodologies have been confirmed by the contractor appointed.

Figure 14.1 Proposed Layout – Masterplan - KMMP-HYP-ZZ-DR-A-0100



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14.3 Receiving Environment

The proposed development is located in Kilmeaden, Co Waterford. The proposed development location lies to the south of the R680, within the townlands of Ballyduff east, Amberhill and Blacknock, Co Waterford.

The previous land use of the development site include the former Kilmeaden cheese factory and undeveloped agricultural lands which ceased in 2005.

The site is in the ownership of Crag Rathnew Ltd & Kent Holmes Ltd. The site is bound by agricultural and brownfield sites. The proposed development is surrounded by extensive agricultural lands with a few small residential settlements. No industries are within the study area with a small number of commercial businesses within 2.5km from the proposed development. The closest industrial facilities to the proposed development are located c. 6.5km northeast in Waterford city. Further details on the nature of local settlements are presented in Chapter 4 – Human Health.

In an environmental assessment carried out by Glanbia of the existing site and surrounding areas, the following utilities were identified as sources of potential environmental concern: Above ground fuel tanks, ESB/Glanbia Transformer & substation building, surface runoff drains, Service corridors including foul and storm drainage. With potential off site contaminants including the former Integrated Constructed Wetlands (ICW) and irrigation lands, former holding tanks and the adjoining farm - formally the effluent store prior to the ICW.

14.3.1 Land Use, Property and Access

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The Proposed Development Site is 108.64 hectares of which c. 27.187 hectares is the proposed Technology Park and Village Centre, and the remainder is the proposed Solar Panel Farm (overall c. 80 hectares). The overall topography of the site is highly variable with a minimum elevation of approx. 16.0m at the north of the site and a maximum elevation of approx. 89.0m at the summit of the hill.

A portion of the site within the village boundary is identified as a Regeneration and Opportunity Site – Further development of existing complex. Potential Landmark/gateway to village. Desirable street edge. Potential mixed use, incorporate natural assets. Potential open space. Green infrastructure links. Potential Housing Yield.

The identification of relevant, existing, and approved developments is required. A comprehensive search is undertaken to identify all developments within the vicinity of the Proposed Development site. Subsequently, a review of the magnitude, size, scale, location and current status of these developments is undertaken to assess the potential to contribute to significant cumulative effects. This secondary stage is to focus on effects that are either inherently significant or possess the potential for significance.

This process is facilitated through the utilisation of the planning search tools listed below which collectively hold a comprehensive inventory of planning applications, which systematically generated a comprehensive list of relevant planning permissions granted within the immediate environs of the Proposed Development.

This comprehensive review is crucial in the context of assessing the potential cumulative effects of a proposed project. It aids in gauging the extent to which these existing and future undertakings might, interact with the Proposed Development, and allow for the exclusion of insignificant developments from any further consideration.

This strategic approach ensures that resources are not expended on negligible or inconsequential effects.

The following were consulted:

- The Department of Housing, Local Government and Heritage EIA Portal
- An Bord Pleanála Map Search
- My Plan National Planning Application Map Viewer
- Waterford County Development Plan

Appendix 2.1 contains the relevant planning history within the surrounds of the subject site. This list is not intended to be an exhaustive list of all developments, the intent is to provide history for their EIA determination by outlining the relevant existing or permitted development that have the potential to give rise to likely significant cumulative effects in combination with the Proposed Development. The consideration of likely significant cumulative effects has been considered as part of the impact assessments within Section 14.5 of this report.

In an Environmental Assessment Report[1] carried out by Malone O' Regan for Glanbia dated December 2009 of the existing site and surrounding areas, the following utilities were identified as potential environmental concerns;

- Above ground fuel tanks,
- ESB/Glanbia Transformer & substation, surface runoff drains,
- Service corridors including foul and storm drainage.

[1] Malone O' Regan Environmental Assessment Glanbia PLC Kilmeaden Co. Waterford

- Potential off-site contaminants including; the former Integrated Constructed Wetlands (ICW) and irrigation lands, former holding tanks and the adjoining farm (formally the effluent store prior to the ICW).

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14.3.1.1 Access

At present, the site is currently accessible via the existing access to the Kilmeaden Cheese Factory, which is located off a local unnamed road which runs along the northeast of the redline boundary before joining the R680. Another public unnamed road divides the two land banks of the proposed development (north – south) A private road (Cul de Sac) leads off this road to the hilly lands in the west. Technical layouts are included in Homan O Brien DRG No. 24290SK-01. Further details on traffic and roadways are discussed in Chapter 13 Materials Assets - Traffic and Transportation.

14.3.2 Power and Electrical Supply

The record maps from ESB identify several LV, MV and HV overhead lines. A utility mapping survey was carried out by Apex Surveys[2]. The survey consisted of the following methods of surveying; chamber inspections, radio detection, direct connection, flexi and sonde, signal sweeping, and GPR. A report was generated on the findings of underground services and overhead powerlines.

The majority of ESB lines are located above ground. There is one overhead line that passes through the centre of the site from offsite east of the site traveling west to an electrical pole (ep). It continues north leading to outside site extent.

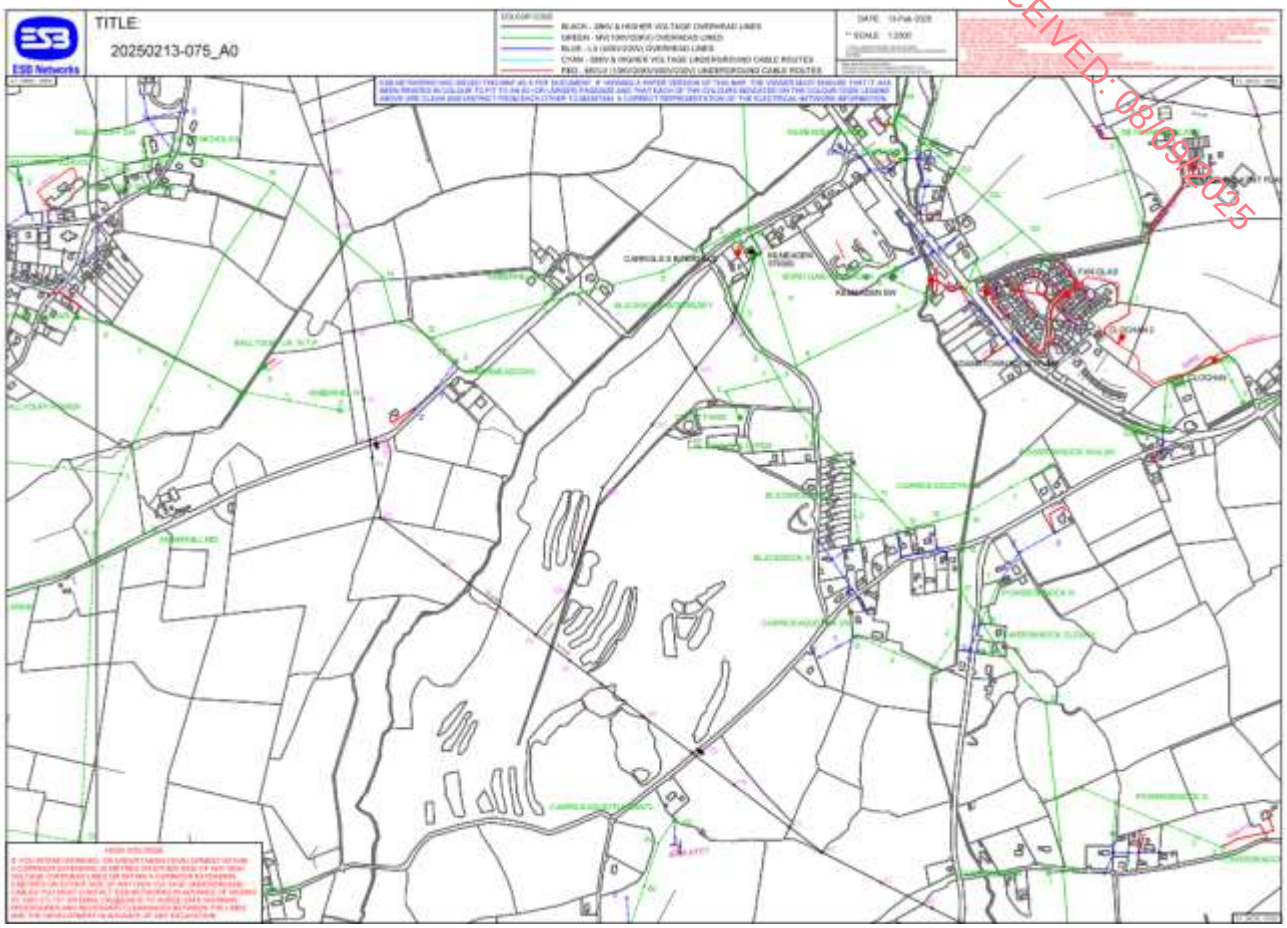
There is also an overhead line along the west road running south, leading to outside site extent. A short overhead line is located east off site that runs through the site diagonally until it passes to an electricity pole and turns back east to an additional ep.

On the southwest, there is an overhead line that runs along the road onsite from north to south.

There are two underground electrical lines. One located on the small northeast site, leading to outside site extent and the other line in the southeast running along the wastewater treatment line. See ESB map Title 20250213-075_A0 below of overhead power lines in green and blue and underground lines in red. The Apex survey report and associated drawings have been submitted with this application.

[2] Apex Surveys Underground Utilities Survey Report | DUB50 Kilmeaden, Waterford |Echelon Data Centres |6947

Figure 14.2 Telegraph ESB pole networks map Title 20250213-075_A0



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14.3.3 Telecommunications

There is a telecommunications line located off site north of the site that runs from west to east.

There is also telecom line located in the small east site running from a telegraph pole leading west to outside site extent.

There are a few overhead telecom lines. One line is located in the small east site that runs from the telegraph pole south of the site running north leading to outside site extent.

Another overhead line is located off site along the north small site which runs from east to west. There are also two telecom lines that run on site, located on the west road of the site, and located south running parallel.

There is also five small overhead lines located along the west road, one located on the north of the road that runs from off site, south to a telegraph pole. The other two are located south on that same road, one running from one telegraph pole passing through an additional telegraph pole leading to outside site extent.

The other further south of the site, running from an offsite telegraph pole through an additional onsite telegraph pole then leading to outside site extent.

Eir have identified many telecom ducts in the area. Virgin Media have confirmed no infrastructure in the area

The above should be read in conjunction with Apex survey findings and associated maps Refs: 6947 DUB50 Kilmeaden, Waterford-UG-200-ITM15 2D-1 to 6947 DUB50 Kilmeaden, Waterford-UG-200-ITM15 2D-33 submitted with the planning documentation.

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14.3.4 Surface Water Infrastructure

There is a series of Integrated Constructed Wetlands (ICW) located within the area southwest of the cheese factory. Following the closure of the 'Kilmeaden Cheddar Cheese' factory, the functionality of these water management systems has diminished. Over time, many of these ponds have dried out, transitioning into areas dominated by scrub vegetation. However, two ponds still retain water.

Consultation of the Uisce Éireann (UE) database shows that there are no registered storm sewers in the immediate area around the proposed site. However, an investigation along the R680 using Google Earth shows numerous road gullies indicating the presence of an unregistered storm sewer. A site visit confirmed the same. The EPA online River Flow maps indicate a culvert/watercourse, illustrated with a blue line, heading north-south.

There are two existing watercourses running along the northern & eastern site boundary.

Additional drainage details are provided in the infrastructure report and drawings by Atkins Realis Ireland accompanying this planning permission.

Figure 14.3 Existing watercourses Source: Atkins Civil Engineering report



14.3.5 Foul Drainage Infrastructure

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Regarding the foul sewer record map from UÉ, no existing foul network is shown inside the site boundary, with the exception of a wastewater treatment plant at the south.

A disused septic tank and percolation area is believed to be in place in the southwest portion of the site. This tank is believed to have a capacity of 40 to 60 PE.

However, following a utilities underground survey on the proposed site by Apex Surveys it is believed that foul lines run through some aeras of the site.

A foul sewer line is located off site on the north side of the site. The foul line continues east along the road towards the main road R680. Additional foul lines merge onto the main trunk line. Two further drainage lines were found to be located on the south east of the site following the utilities survey. One line is foul which continues west where it then flows north to a municipal wastewater treatment plant. The other drainage line is a storm line which passes west along the site boundary and then runs north before turning west again ending with no further trace.

The above should be read in conjunction with Apex survey findings and associated maps Refs: 6947 DUB50 Kilmeaden, Waterford-UG-200-ITM15 2D-1 to 6947 DUB50 Kilmeaden, Waterford-UG-200-ITM15 2D-33 submitted with the planning documentation.

14.3.6 Potable Water Supply

There are several water supply pipes passing through the site and a diversion application to relocate those watermains away from the new development has been submitted to UÉ (ref. DIV 24393).

A water line for the east Waterford water scheme is located to the east of the site. There is a watermain located mainly on the south side of the site. Two lines run parallel from east to west leading to outside site extent. There is also a watermain line further south that flows from east to west leading to no further trace (NFT). There is a line located southeast that flows from off site, diagonally leading to outside site extent and another line located in the centre of the site running from south to north until NFT. There is a line running through the wastewater treatment from west to east leading to outside site extent. There is a watermain located on the small north site running diagonally from southwest to north east leading to outside site extent.

The pipework material of the water supply are as follows:

- 4" Unsurveyed watermain
- 13" Cast Iron watermain
- 14" Cast Iron watermain
- 600mm Asbestos Cement watermain
- 400mm Asbestos Cement watermain
- 18" Asbestos Cement watermain

The above should be read in conjunction with Apex survey findings and associated maps Refs: 6947 DUB50 Kilmeaden, Waterford-UG-200-ITM15 2D-1 to 6947 DUB50 Kilmeaden, Waterford-UG-200-ITM15 2D-33 submitted with the planning documentation.

A review of the EPA's surface water abstraction register was carried out. 3 no. drinking water abstraction points were identified. The location of these three abstraction points include:

- within the Whelan's Bridge Stream_010 (WAB0000023, L218519, Knockaderry 2),
- (WAB0001902, L122782, Knockaderry Impoundment)
- and (WAB0002270, L218752, Knockaderry 1).

The 3-no. drinking water abstraction points are located upstream of the proposed development site as confirmed by the EPA.

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As outlined in Chapter 6, it is believed that there is no present risk to human health or downgradient environmental impacts associated with the current condition of the site with regards to groundwater aquifers and residential well water.

It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. The current well index shows 10 no. wells are located within the boundary of the proposed development site. The wells usages are "Industrial" for 7 no. boreholes, 1 no. borehole for "Domestic" use and 3 no. well usages are currently unknown. A further 23 no. boreholes are mapped in the wider study area within a 2km radius of the proposed development site.

There are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the proposed development site.

The nearest Group Scheme Preliminary Source Protection area is Ballydurn, located c. 10.7km north-west of the proposed development site. The nearest Public Supply Source Protection area is Kilmacthomas PWS Ballyogarty located c. 10.8km south-west of the proposed development site.

The importance of the hydrogeological features at this site can be rated as 'High' importance with high significance or value on a local scale, due to the aquifer beneath the site being classified as a "Regionally Important Aquifer – Fissured Bedrock" (Rf), capable of supplying regionally important supplies (e.g., large public water supplies) and contributes to the baseflow of local rivers (i.e. the Whelanbridge River, Whelanbridge Trib 1 and the Lower River Suir SAC).

14.3.7 Natural Gas

The site is located in a 'High Radon Area'. Ground gas – carbon dioxide is identified as a very low risk according to an Environmental Assessment report carried out for Glanbia by Malone O Regan in 2009.

The record maps from Gas Networks Ireland, show an installation at the northeast part of the site, with a high-pressure transmission pipe and two low pressure distribution pipes. The gas lines are proposed to be removed from site and the supply to the site boundary shut off.

There will be no onsite gas network line required for this proposed development. A further planning permission will be made in relation to an NGI connection.

14.3.8 Anomalies in Utility Lines

Lines of anomalies are found throughout the site during the Apex utilities survey. Some are running along the west road on site leading north. There are also anomalies located on the north road off site, running along the site towards the main road R680. There are additional anomalies located south and southeast of the site. There are also three anomalies located on the small east site and five on the small north site. Two running from east to west leading to outside site extent. The repositioning and decommissioning of these anomalies is yet to be determined.

14.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project,

including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

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The proposed development is located in Kilmeaden, Co Waterford and comprises four distinct but connected areas including a new village centre, a solar farm and rewilding area including grid scale battery storage, and a data centre with associated energy centre (the "proposed development"). The proposed development location lies to the south of the R680, within the townlands of Ballyduff east, Amberhill and Blacknock, Co Waterford.

An additional development consisting of a 220KV substation and gas connection will seek separate planning permission and a separate planning application will be made. This separate proposed development will be the on-shore site for a proposed windfarm off the coast of Co. Waterford.

Phasing will consist of a demolition phase, construction, operation and decommission phase.

The proposed development consists of three ICT buildings, a proposed 35MW solar farm with 220KV HV grid connection providing power to these buildings. The onsite power generation facility will compromise of 16 dual fuel gas 14.2MWe turbines and 2 reserves and 16 flue stacks. The development also includes a 114 MWe Battery Energy Storage System (BESS). A new village centre comprising a medical centre, pharmacy, café, gym, community centre, commercial units, creche, two apartment blocks and a warehouse building.

The Proposed Development Site is 108.64 hectares of which c. 27.187 hectares is the proposed Technology Park and Village Centre, and the remainder is the proposed Solar Panel Farm (overall c. 80 hectares). The overall topography of the site is highly variable with a minimum elevation of approx. 16.0m at the main entrance and a maximum elevation of approx. 89.0m at the summit of the hill.

For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

The development of the site will ideally commence in Q4 2026 when grant of planning is received. The village centre is expected to be completed in Q2 2029 with the technology park to follow in Q1 2030.

14.4.1 Demolition Phase

Demolition is required on site prior to construction. Demolition work is expected to amount to 24,100sq.m approximately. The nature of the demolition waste is concrete and some asphalt. It is expected that 27,715t. of waste will be generated for disposal. Demolition and enabling works are expected to last for 4-6 months. The onsite gas line will be decommissioned but will remain in place. It is to be confirmed if this line will be put to use as part of a separate planning permission for the substation.

14.4.2 Construction Phase

The construction phase will pose the most risk of potential environmental impacts on the utilities due to the intrusive works involved. The proposed new village centre and technological park will have a considerable amount of construction and excavation work involved in this phase, however the solar farm will require minimal excavation.

The development is expected to start construction in Q4 2026 when grant of planning is received. Phase one consists of enabling works of the site, access, berms and cut & fills etc. This is expected to last between 4-6 months. The village centre is expected to be completed in Q2 2029 with works expected to last between 24-36 months. The data centres will also begin in Q2 2026, works is expected to last 39 months coming to completion in Q1 2030. The energy centre will start in Q4 2026 with works expected to

be 24 months coming to completion in Q4 2028. The Solar farm & BESS will start construction in Q2 2028 lasting 23 months with expected completion in Q1 2029.

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14.4.2.1 Land Use, Property and Access

It is anticipated that the construction of the facility will be completed during the working hours of 07:00 to 19:00 Monday to Friday. However, it is possible that the contractor may wish to carry out certain operations outside these hours i.e. half days on Saturdays or evenings during long summer days etc. These opportunities will be kept to minimum and will take place over a short timeframe. It is anticipated that this is unlikely to cause a disturbance impact.

The total construction population on site will be a maximum of 750 staff for the duration of construction. Staff include site management, engineers' construction workers, foremen, supervisors and indirect subcontractors.

14.4.2.1.1 Access, Traffic and Parking

The subject site will be accessed from a new entrance at the north of the site off the local road R680 Road. The location of the site compound and contractor's carpark will be discussed in the Construction Environmental Management Plan (CEMP) being prepared by Atkins Realis. It is anticipated that for the duration of the construction works, all access and egress for HGV deliveries will be from this new entrance.

There will be a temporary car parking facility in place for construction staff. Traffic on site is expected to be generated by construction workers private vehicles, security and subcontractors along with excavation plant machinery and supply trucks. More details on access and traffic are available in Chapter 13 Materials Assets - Traffic and Transportation.

14.4.2.1.2 Excavation for Services

The Proposed Development will require the excavation and disturbance of soils and stone materials for the purposes of levelling, foundations and installation of services. Quantities of excavated material have been estimated by Atkins (see Chapter 6 table 6.3) based on the finished floor levels presented in the civil engineering drawing pack. Suitably excavated material, including topsoil will be retained on site for use as backfill and landscaping however there is limited opportunities for reuse onsite.

There are several water supply pipes passing through the site and a diversion application to relocate those watermains away from the new development has been submitted to UÉ (ref. DIV 24393). Correspondence from the Uisce Éireann Diversions Team was received 7th April 2025. In the email (presented in Appendix B of the Atkins Civil Engineering report) it was illustrated how the diversions should be presented at this stage. The diversion requirements have been adopted as closely as possible and resubmitted to Uisce Éireann 9th April 2025 for review. The submitted watermain drawings illustrate the incorporation of these diversions. The material associated with much of the existing on site water pipework is asbestos. Mitigation is required in the construction stage as part of the CEMP.

Should excavated material need to be removed from site it will be taken for appropriate offsite reuse, recovery, recycling and / or disposal. This includes the correct disposal and management of asbestos pipework associated with the existing watermains.

14.4.2.1.3 Waste Associated with Construction

Environmental soil analysis will be carried out prior to removal of the material on several soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Any surplus excavated material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities

/ landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

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14.4.2.2 Power and Electrical Supply

During construction, contractors will require temporary power for onsite accommodation, welfare facilities and construction equipment/plant. It is expected that construction electricity will be supplied by a temporary connection by the ESB. A submission has been made to ESB.

14.4.2.3 Telecommunication

The construction site will require internet and phone connectivity for communication with clients, contractors, and suppliers. Mobile phones are expected to be used for this purpose. Internet connectivity will be achieved through the use of wireless networks.

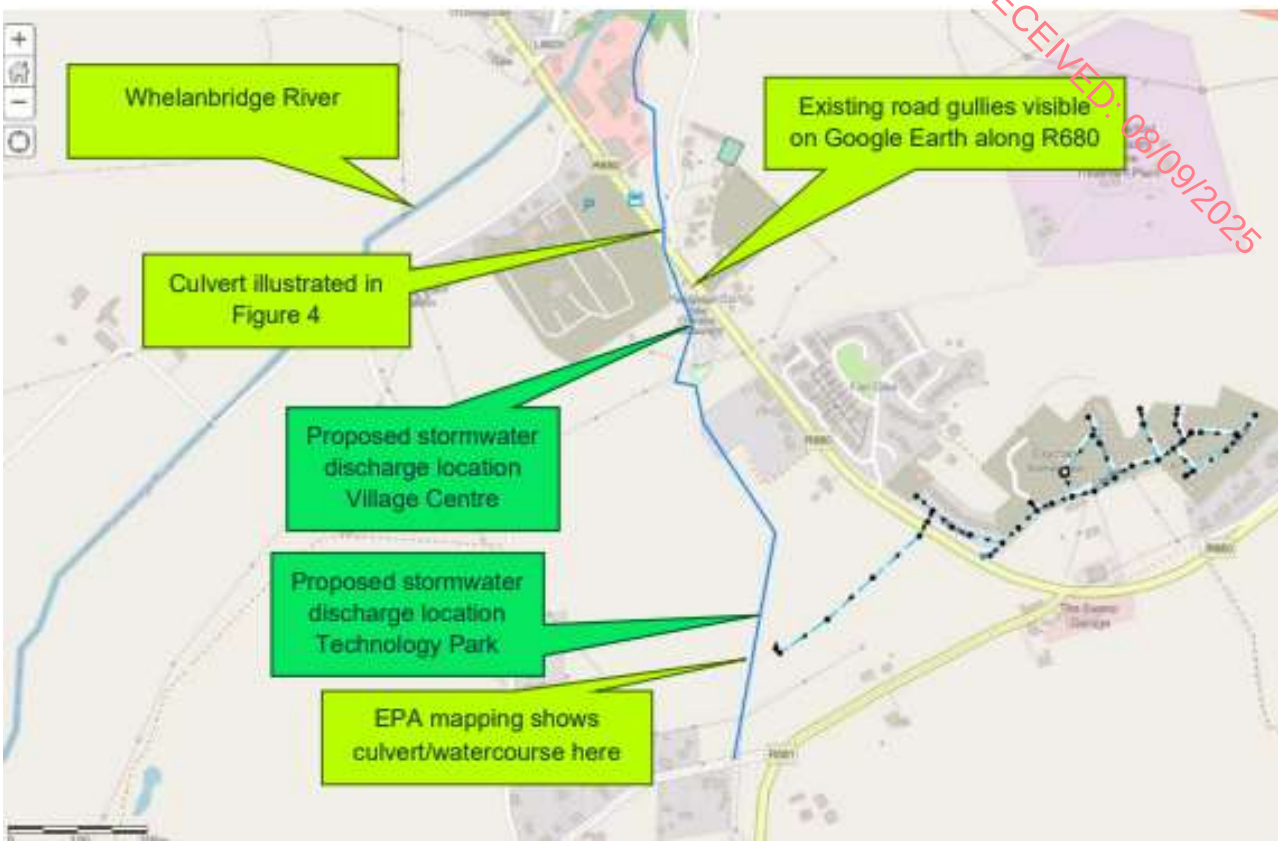
14.4.2.4 Surface Water Infrastructure

The activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the hydrological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the proposed development. Minimal excavation works will be required for the construction of the proposed solar farm on Blackknock Hill.

During the construction phase, the development site will require temporary stormwater collection drains. This will be confirmed by the main contractor.

The temporary attenuation and silt retention system will undergo settlement to reduce the risk of suspended solids entering the watercourse.

Figure 14.4 Technical note Kilmeaden Masterplan Preplanning Overview Technical Report



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14.4.2.5 Foul Wastewater Drainage

The proposed development does not currently have a connection agreement in place with Uiscé Eireann.

A Pre-Connection Enquiry has been lodged with UE and confirmation of feasibility is anticipated in the coming weeks.

It is believed that there is capacity within the UE network to accept discharge from the proposed development which will also require a licence to discharge trade effluent to sewers.

During the construction phase staff facilities will be in place and will include the provision of Portaloo's, which will be maintained under contract with the service providers.

14.4.2.6 Potable Water Supply

During the construction phase potable water will be supplied for all construction staff. This will be via a UE connection or portable bowsers which will be confirmed at a later stage.

Water will also be required for cleaning and general construction type activities such as cleaning of equipment, washing down surfaces and roads to reduce dust and dirt nuisance.

14.4.3 Operational Phase

14.4.3.1 Land Use, Property and Access

The primary access for the proposed technology park will be directly from the R680 in the form through a newly proposed access point. An emergency and delivery access point will be provided for the Technology Park. The secondary access is for emergency use only i.e. should the main entrance be blocked. Pedestrian

and cycling access for the Technology Park will be provided by internal connections from the proposed Village Centre.

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The village centre comprises a proposed community centre, creche, two number apartment blocks (apartment block A and apartment block B), medical centre, pharmacy, warehouse building, gym and café.

The access point for the village centre will be through the existing access from the local road. Pedestrian and cycling access will be facilitated via both the local road and R680.

Road grades are to be designed to be in line with DMURS. The proposed levels of the village centre will be varied from approximately 22.4m to the south of the village to 16.0m to the north of the village.200mm bituminious on 150 mm CL804 on 600mm capping.

Speed limits within the data centre is expected to be 20km / hr.

Porous asphalt is proposed as a surface covering approximately 120 mm on 30mm Choker Course on 220mm cl 804 with permeable nonwoven geotextile concrete slab turning bays for in the car parks with typically 200mm asphalt on 150mm road base on up to 600mm capping. This type of asphalt provides drainage solutions for capturing and controlling the release of surface water.

Car parking facilities in the Village Centre include residential parking at apartment block A and apartment block B. the carpark will consisting of a total of 60 car parking space, 6 accessible and 12 EV spaces inclusive. The village will hold a total of 60 bicycle parking spaces 40 spaces between apartment block A&B and 20 spaces within the courtyard.

Construction of a bridge across the existing stream will be required As Part of the primary Technology Park access from the R680.It will be designed in accordance with OPW and Local Authority requirements as well as being designed for the 100yr flood event with a minimum of 300mm freeboard. It is proposed to use 800mm deep beams spanning approximately 20m with 200mm precast flat top and road constructed on this. The beams will sit on cast insitu abutments which will sit on a piled foundation. This will be subject to detailed design when a detailed site investigation has been carried out. All fencing and edge protection will comply with TII edge restraints requirements.

Footpaths will consist of 100mm C25/30 concrete on 100mm CL 804, this will cver the pedestrianised area.

There are a total of 173 parking spaces allocated for non-residents in the village centre. Nine of these parking spaces will be accessible parking and 37 designated EV parking space

It is proposed that the Village Centre and Technology Park will use different access points.

The Technology Park main access road connects to R680, the Village Centre main access road and emergency entrance to the Technology Park connects to the local road at the north of the development. In terms of traffic generation, ICT Facilities, whilst in operation, typically create low levels of vehicular traffic.

Deliveries and / or collections by HGV vehicles will be limited to 3-5 vehicle movements per day. Furthermore, the provision of electric vehicle (EV) charging points in the car parking areas to promote the use of zero emission vehicles will be included in line with TGD Part L 2022.

14.4.3.2 Power and Electrical Supply

The village centre is proposed to be the first new village centre in Ireland to be 100% fossil fuel free.

This will be achieved by proposed renewable energy solutions combined with waste heat recovery systems, adopting a circular approach to energy efficiency and resource management.

Waste heat will be captured for reuse in the proposed village centre. The waste heat exchanger within each ICT facility shall remove heat from the facility side chilled water system before it is exhausted to the atmosphere. This waste heat will be distributed to the village centre through a hydraulic flow and return piped water distribution system. The waste heat plate heat exchanger located in each ICT facility building has the ability of recovering 505 GWhs of waste heat per annum, which is well in excess of the heat demand for the proposed village centre.

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The potential for off-site heat recovery and required district heating infrastructure will be subject to feasibility assessment by WCC.

A solar farm is planned to be developed in the lands to the south of the site as outlined on the architectural drawings included in this planning application. It is anticipated what the solar farm will generate 29 MW of renewable energy which will be used to partially offset the power demand from the proposed ICT facilities. The solar farm will consist of 43,056 bifacial leapton 690\W solar panels mounted on concrete footing with a total capacity of 29.71 MWp. The solar farm has an expected lifespan of 30 years.

The proposed 3 no ICT facility buildings on the site with hybrid cooling systems incorporating Direct to Chip Liquid Cooling and CRAH Cooling. Each building will be equipped with a facility side chilled water system which shall serve the CRAHs in electrical rooms and Direct to Chip Liquid Cooling Distribution Units (CDUs) and CRAH units in the Data Halls. Facility side chilled water shall be generated by 28no. 2000kW free cooling chiller modules (N+2) located on the roof gantry. The assessed peak cooling load is 52MW per building. This equates to a peak heat rejection load of approx. 156MW from the ICT facilities.

It is intended to provide capture low grade waste heat from the proposed ICT buildings and reuse in the proposed village centre to offset heat demand associated with space heating and domestic hot water generation. The estimated heat demand for the village centre is outlined in the Homan O Brien Energy Statement.

Table 14-1 Homan O Brien Energy Statement Report December 2024

Building	Peak Load (kW)	Annual Demand (kWhs)
Apartment Block A	160	
Apartment Block B	160	
Commercial Unit 01	75	13,735
Commercial Unit 02	75	13,735
Community Centre	115	108,443
Crèche	105	67,832
Mixed Use - Gym	122	84,354
Mixed Use - Café	44	
Mixed Use - Pharmacy	22	
Mixed Use – Medical Centre	48	
Mixed Use - Office	28	
Supermarket	190	24,190
Village Centre – Warehouse/Office 01	55	
Village Centre – Warehouse/Office 02	45	
Technology Park – Warehouse/Office 01	100	

Building	Peak Load (kW)	Annual Demand (kWhs)
Technology Park – Warehouse/Office 02	100	
Total	**1,444**	

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This dual fuel open cycle gas turbine (OCGT) technology, is designed to meet flex demand conditions imposed by the grid connection. The onsite power plant will provide support services to the grid thus alleviating constraints on the national grid and allowing greater integration of renewable energy. When necessary, it will be capable of powering the ICT facility.

The datacentre will be powered from the grid. In the event of a loss of power supply i.e. temporary grid blackout, back-up generators will be provided to maintain power supply and provide emergency power if required. The generators are designed to automatically activate and provide power pending restoration of mains power. The generators will be powered by HVO rather than diesel to minimise environmental impact. Each datacentre will have 20 no. generators. Air modelling has confirmed that flue height will be 25m and will include SCR abatement to ensure protection of receiving air quality environment.

The required HVO to operate the datacentre backup generators will be supplied by belly tanks (c. capacity 25m^3 x 20 gensets per building). Total HVO storage will be a maximum of 4500m^3. The Energy Centre will be supplied from 6 no. 500 m^3 tanks.

A solar farm is planned to be developed in the lands to the south of the site as outlined on the architectural drawings included in this planning application. It is anticipated what the solar farm will generate 29 MW of renewable energy which will be used to partially offset the power demand from the proposed ICT facilities.

The BESS layout is located adjacent to the solar park accessed by a separate internal road. The BESS is presented in drawing no. 2429-SK-02 and comprises 4 x 36 MW "banks" with 144MW for 3.5 hours autonomy. An internal access road will be laid to the BESS facility.

14.4.3.3 Telecommunications

With regard to the village centre, a dedicated Telecom Frame Room for each building is proposed. This room would be approx. 7m² for each building. A separate Security Room would also be required for housing security infrastructure. A telecommunications distribution network is in place in the area. The requirement for telecoms is minor for this proposed development and there is sufficient capacity in the network.

14.4.3.4 Surface Water Infrastructure

It is proposed that the development site will collect the surface water runoff and discharge the flow under gravity conditions into the local streams at the north and east of the site utilising three outfall locations.

The proposed impermeable area considered is 2.854ha for the Village Centre and the proposed impermeable area considered is 10.322ha for the Technology Park.

The proposed surface water network have been modelled using the MicroDrainage tool. The MicroDrainage model shows that the proposed surface water network has adequate capacity for the flows that will be generated from the proposed development and will achieve full bore self-cleansing velocities of 1m/s to an upper limit of 2.5m/s.

Forecourt separators are specified on loading bay areas and bypass separators located upstream of outfalls discharging into the attenuation ponds on site.

To utilise the attenuation ponds and infiltration tank efficiently and to the maximum potential, flow control devices will be installed downstream of the ponds outlet pipes to ensure the surface water runoff is stored, maximising storage potential, prior to entering the network downstream.

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It is proposed that a combination of Sustainable Urban Drainage Systems (SUDS) be utilised to attenuate flows throughout the site and allow for the calculated reduced discharge to the existing network. The proposed drainage network and surface runoff will comply with Waterford County Council and SUDs requirements. All surface water generated from the proposed development is to be attenuated on-site and discharged to the Whelanbridge Trib 1 located along the sites eastern boundary at greenfield run-off rate. It is envisaged that there will be 2 no. discharge locations for the village centre and 1 no. discharge location for the technology park. Further details on the surface water associated with this proposed development will be discussed in Chapter 6 Hydrology and Hydrogeology.

There is no requirement for abstraction of groundwater during operational phase. The SuDS design will involve discharge to ground beneath the north car park of the village centre to allow for surface water storage, as well as infiltration to the surrounding soil prior to discharging to the downstream network.

Surface water network has adequate capacity for the flows that will be generated from the proposed development and will achieve full bore self-cleansing velocities of 1m/s to an upper limit of 2.5m/s. All fuel tanks are bunded. Transformer bays are also bunded to avoid oil spillage.

Rainwater Harvesting Tanks will be provided to store rainwater for reuse in in process adiabatic cooling installations.

The proposed stormwater discharge points will be to the existing watercourse/culvert traversing the site. there will be two discharge points, one for the Village Centre and one for the Technology Park.

The ground under the solar panels shall be maintained as grassland which will serve to reduce the risk of erosion and limit surface water flows across the site. The operation and maintenance of the solar farm shall include monitoring and maintenance of the grassland beneath the panels. Where compaction of soil is observed, the ground will be cultivated and re-seeded.

14.4.3.5 Foul Drainage Infrastructure

A Pre-Connection enquiry application was submitted to Uisce Éireann in December 2024 for the wastewater discharge of the proposed development (reference CDS24011093). It is proposed to provide separate foul networks for the Technology Park and the Village Centre, to enable monitoring of the wastewater discharge from the Data Centres and Energy Centres separately from the domestic wastewater discharge from the Village Centre.

For the Technology Park, it is proposed to provide a 225mm foul water pipe network along the perimeter of the Energy Centre and the Data Centers and tie in with the existing foul network running to the north of the site. A new manhole is proposed for this connection and the existing foul sewer line is proposed to be upsized to 255 mm and reconstructed up to the main road.

For the Village Centre, it is proposed to provide a 225mm foul water pipe network along the internal road network of the Village Centre and connect to the existing foul manhole to the east of the site.

All foul water generated on the proposed development will be sent to Ballyduff Lower-Kilmeaden Waste Water Treatment Plant (WWTP) (Reg: A0370), located c. 620m north-east of the site along the Lacka Road.

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Table 14-2 Expected Wastewater demand. Source Atkins Civil Engineering Report

Description	Domestic		Industrial	
	Daily Average Discharge (l/s)	Daily Peak Discharge (l/s)	Average Discharge (l/s)	Peak Discharge (l/s)
Village Centre				
Apartment Blocks A&B	0.367	2.200		
Future Expansion	0.773	4.641		
Creche	0.285	1.712		
Supermarket	0.336	2.017		
Community Centre	0.219	1.315		
Multiuse Building	0.202	1.215		
Warehouses/Offices	0.183	1.100		
Commercial Unit	0.058	0.348		
Technology Park				
Warehouses/Offices	0.547	3.285	0	0
Energy Centre	0.032	0.191	0	0
Data Centre 1	0.032	0.191	1.190	2.756
Data Centre 2	0.032	0.191	1.190	2.756
Data Centre 3	0.032	0.191	1.190	2.756

The expected wastewater demands are outlined in table 14.2. Industrial loadings are expected to be more constant than domestic however domestic discharge have more peaks. Domestic discharge overall has been scaled with the development.

The BESS stormwater network will connect to an attenuation pond, with the capacity of 1200 m3, sized to contain the 24hr - 10yr rainfall return period event, plus the 252 m3 of fire water that could be applied in the event of a fire. Under normal operation, the attenuation tank will connect to the Technology Park surface water network. In the event of a fire, and automatic valve will close and the contaminated water will be collected in the attenuation tank for removal.

14.4.3.6 Potable Water Supply

A PCE application has been made to UE for 3 number water connections. It is expected that 4.563l/s will be the demand associated with the village centre and 5.702 l/s will be the demand associated with the technology park with 75 l/s has been allocated for fire flow. It is expected that the UE supply will be the sole supply of potable water for the proposed development as it will not be supplemented.

The proposed Technology Park will require potable water for both domestic and industrial usage, whereas the Village Centre will only require potable water for domestic usage.

The total demand for the overall development are outlined in the table below.

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Table 14-3 Total demand for the overall development. Source: Atkins Civil Engineering Report

Description	Population		Domestic		Industrial	
		Demand (l/p/d	Daily Average Demand	Daily Peak Demand (l/s)	Average Demand (l/s)	Peak Demand (l/s)
Village Centre						
Apartment Blocks A & B	192	150	0.333	2.083		
Future Expansion	405	150	0.703	4.395		
Creche	249	90	0.259	1.621		
Supermarket	264	100	0.306	1.910		
Community Centre	287	60	0.199	1.246		
Multiuse Building	318	50	0.184	1.150		
Warehouses/Offices	144	100	0.167	1.042		
Commercial Unit	91	50	0.053	0.329		
Technology Park						
Warehouses/Offices	430	100	0.498	3.111		
Energy Centre	50	50	0.029	0.181	0	0
Data Centre 1	50	50	0.029	0.181	1.322	3.062
Data Centre 2	50	50	0.029	0.181	1.322	3.062
Data Centre 3	50	50	0.029	0.181	1.322	3.062

A new 50 mm diameter connection to the existing watermain is proposed, along the southwestern boundary of the proposed development. Refer to DBFL drawing no. 201103-DBFL-RD-SP-DR-C1301 for layout. IW has confirmed the feasibility of this connection.

It is proposed to provide a 180mm HDPE watermain catering to the process water demands of the Data Centres and Energy Centre. It is also proposed to provide a 63mm HDPE watermain catering to the domestic water demand of the overall development.

In a report by Homan O Brian – Energy Statement February 2024, each building will have a Mains Water Break Tank sized for 30 min max pumped capacity. This Break Tank will be located at ground level. Mains Water will be pumped from the Break Tank in each Building to provide mains water at drinking outlets and the 24-hour Cold-Water Storage Tank. 24-hour water storage will be provided for each building.

14.5 Potential Impacts of the Proposed Development

The potential impacts of the proposed development on material assets specifically utilities in the construction and operational phase are outlined below. These chapters should be read in conjunction with Chapter 13 Traffic and Transport, Chapter 6 Hydrology and Hydrogeology, Chapter 15 Waste and Chapter 16 Interactions.

14.5.1 Demolition Phase

Demolition area of existing factory is 24,100sq.m (approx.) assuming 0.5m deep across the area gives 12,050cu.m waste. Assuming 2.3t/cu.m (some is concrete some is asphalt) gives approx. 27,715t. The demolition phase will be short lived and is not expected to have a long term lasting impact on the environment.

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14.5.2 Construction Phase

Description of potential impacts during the construction phase that have been identified in the description of the proposed development.

14.5.2.1 Land Use, Property and Access

14.5.2.1.1 Noise and Dust

During the construction phase there is a potential for the proposed traffic, access points and volume of site personnel could give rise to additional noise and dust due to site activity.

Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

Mitigation and monitoring measures will be outlined in chapter 10 noise and vibration and in the CEMP. It is anticipated that the contractors work methodology will have measures in place.

Without best practice and mitigation measures in place the impacts associated with the excavation of material for the service of utilities are ***negative, not significant*** and ***short term***.

14.5.2.1.2 Waste generated during construction

Waste generated on site during the construction phase has the potential to impact the land and receiving waterbodies through surface water discharge points. A Resource Waste Management Plan has been devised to ensure waste is segregated and disposed of correctly.

14.5.2.2 Surface Water infrastructure

Local minor dewatering may be required during excavation works and groundworks at the proposed development site i.e. at the location of the new village centre and three (3) no. ICT buildings. During the site investigations carried out by Malone O'Regan (MOR) in 2009, perched groundwater was encountered as minor seepages/saturated soil at depths ranging from 0.2m BGL (beneath the proposed ICT buildings) to 4.9m BGL (c. 200m west of the proposed energy centre). The perched water was generally associated with granular material or top of weathered bedrock. Bedrock was encountered at the site 9.0m BGL in the north-east of the site where the proposed village centre is located, therefore, groundwater is not anticipated to be encountered during excavation works at this location.

The employment of good construction management practices and full adherence to the Construction & Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. There is no impact on surface water infrastructure as a result.

Construction materials will be brought to site by road. Refuelling will be completed in accordance with the best standard practice refuelling procedure. To support the construction of proposed roads, car parks, and buildings, additional fill material may need to be imported.

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Porous asphalt is proposed as a surface covering for in the car parks with typically 200mm asphalt on 150mm road base on up to 600mm capping. This type of asphalt provides drainage solutions for capturing and controlling the release of surface water. This will minimise flooding and build-up of surface water.

The Grasscrete paving will be constructed on suitable areas outside the data centre buildings. Grasscrete is a 'source control' method. It will allow infiltration at source within the voids in the stone. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water and is a recognised part of the suite of SUDS.

With regards to the construction management of stormwater it is proposed to put a French drain around the solar farm area to catch silt and other sediment during the installation and excessive runoff during operational times.

If these designs and best practice methodologies were not in place the impact on the proposed development would be ***negatively*** impacted the severity of ***mild- moderate*** and ***long term*** on the environmental due to this infrastructure related to utilities.

14.5.2.3 Water Supply

Asbestos material associated with much of the existing on site water pipework. Contractors should carry out a risk assessment by a competent professional and an asbestos management plan should be put in place. A specialist contractor should carry out the removal of such pipework. The impact is associated with the construction phase and is closely linked with correct waste management, human health and the health and safety of construction staff. The impact would be a ***negative, significant long term*** but once off effect if mitigation and management were not put in place.

14.5.3 Operational Phase

14.5.3.1 Power and Electrical Supply

A 29MW solar farm is planned to be developed in the lands to the south of the site as outlined on the architectural drawings included in this planning application. It is anticipated that the solar farm will generate energy which will be used to partially offset the power demand from the proposed ICT facilities. Furthermore, the remaining site power demand will be met from grid suppled energy which shall be offset via Power Purchase Agreements (PPAs) which will be executed to provide net additional renewable energy generation capacity that exceeds the power demand of the proposed ICT facilities. In summary, the site power demand will be met by 100% renewable power. The BESS supply "banks" with 144MW for 3.5 hours autonomy. Data centres will be powered sustainably. This means reduced strain on overburdened grid infrastructure in the short term, while enabling renewable energy and investing in alternative energy sources in the medium and long terms. The solar farm solely does not have the capacity to offset the power demand. Without this design in place the proposed village centre will have an increasing demand on the national grid, potentially having a negative moderate long term effect on the grid connection. In a scenario where fossil fuels would be used rather than renewable energy to power the development, the impact would have a moderate, long term, negative impact on the environment.

14.5.3.2 Heat Demand

Up to 505 GWh's per annum of heat could be available from the ICT Facilities. The operating profile of the power generation facility is not defined at this stage to confirm if this would provide a consistent source of waste heat. The heat demand data for Waterford City south of the River Suir is 385 GWhs. The heat demand for the proposed village centre is much lower. The projected heat demands for Waterford City

south of the River Suir which falls within the 10km radius of the proposed site is estimated at 385 GWh's, based on this initial assessment of the heat atlas map. It should be noted that these figures are unscreened, and it may be impractical to connect many of the heat loads included within these figures to a heat network in that area. There will be no impact associated with heat demand for the proposed development.

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14.5.3.3 Surface Water Infrastructure

Rainwater harvesting is proposed for use in the cooling process. Adequate supply demand has been forecasted, and the proposed UE connection will be in place in bouts of dry weather with a decrease in rain harvested.

As per the Flood Risk Assessment that has been undertaken for the site, store water attenuation and run off has been considered in detail for the proposed development given that impermeable surfaces (buildings and roadways) are increased compared with the existing site. An attenuation pond is included in the design as part of the proposed development. Stormwater will be attenuated on site for the 1:1000yr flood event.

In addition, storm drainage from the generator yards is drained through an oil interceptor to treat any accidental hydrocarbon vehicle leaks and HVO leaks. Interceptors are also located above and below the attenuation pond i.e. prior to stormwater discharging from the site.

In addition to these measures, it is proposed to construct one attenuation area first to manage construction run off water this measure is to protect the local hydrology due to the site's proximity to local rivers

No significant flood evets have been identified in the accompanying Flood Risk Assessment carried out by Atkins January 2025. There is localised flooding to the north of the site around the Wheelanbridge tributary. It should be noted that the only construction proposed in this area is the construction of earth embankments and that appropriate compensation storage has been provided. It is concluded that there is no significant residual risk from this.

14.6 Mitigation Measures

The following mitigation measures should be put in place in an attempt to protect the environment during the demolition, construct and operational phase of this proposed development as a result of activities associated with the material assets – utilities.

14.6.1 Demolition Phase

14.6.1.1 For the protection of surface waters

Measures should be implemented to prevent contamination of utility infrastructure by silt, oils, or other pollutants during demolition.

14.6.1.2 Service protection

Identified utilities should be clearly marked on-site, and protective measures (e.g., physical barriers, exclusion zones) will be put in place to prevent damage during excavation and construction activities.

14.6.2 Construction Phase

14.6.2.1 For the protection of surface waters

A temporary surface water management plan should be implemented to control runoff and prevent siltation or pollution of nearby watercourses. Measures include silt fencing, sediment traps, and designated washout areas.

14.6.2.2 Traffic

Utility works should be coordinated with the traffic management plan to minimize disruption to local residents, businesses, and road users.

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14.6.2.3 Foul Drainage

Temporary welfare facilities should be managed. A licensed wastewater collection services should be put in place to prevent contamination.

14.6.2.4 Electricity Supply

Excavation near underground electrical services will follow Health and Safety Authority (HSA) guidelines and be supervised by qualified personnel.

14.6.3 Operational Phase

14.6.3.1 For the protection of surface waters

Regular inspection and maintenance protocols should be established for all SuDS components.

14.6.3.2 Process water discharge

It is proposed that 90 % of process water from all services other than domestic from the proposed development will be discharged. A discharge monitoring point should be implemented in the operation phase to assess the quality and the flow to protect the receiving water bodies.

14.6.3.3 Foul Drainage

Pre-treatment systems (e.g., grease traps or chemical neutralisation) should be installed where necessary to protect downstream infrastructure.

14.6.3.4 Power and Electrical Supply

Electrical demand, especially from the data centres and battery storage facility, has been assessed in consultation with EirGrid/ESB Networks. Any required network upgrades or substation installations should be completed prior to operation.

All electrical infrastructure will be designed with redundancy and fire protection systems, particularly for the high-load data centres.

14.7 Monitoring or Reinstatement Measures

14.7.1 Demolition Phase

Preparing the site will involve demolishing structures within the former factory grounds, to level the area for the planned development. Any excavated material will be temporarily stored in a controlled manner to avoid the unintentional spread of dust and to manage surface water runoff, which could carry sediment and other materials.

14.7.2 Construction Phase

- Monitoring should be compliant with the proposed planning conditions and the CEMP associated with this development.
- Auditing and inspection of construction should take place during particular construction phases such as concrete pouring, refuelling and working on utilities.

- Silt fencing, buffer zones and general good practice should be implemented to control the potential pollution to waterways.
- Construction workers should be made familiar with pollution prevention with regards to working near water courses, drainage and waste while working on site.
- A lock out tag out system should be followed during the installation and working on electrical and power on site.

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14.7.3 Operational Phase

The energy centre should have periodic monitoring and sapling carried out on the discharge associated with this area of the site. An IED licence will be sought from the EPA to include monitoring of surface water and nearby ground water conditions. There will be no requirement for further monitoring of the surface water associated with the village centre as there is no potential high risks associated with the nature of this area on the proposed site.

14.7.4 Decommissioning Phase

The Decommissioning Plan for Kilmeaden Solar Farm outlines a detailed and practical strategy for the safe, orderly, and environmentally sound restoration of the site once the solar farm has reached the end of its operational period.

Similarly, the decommissioning process for the Data and Village centres should include provisions for a secure, well-managed, and environmentally sustainable restoration of those sites, in coordination with the local authority, upon the conclusion of their use.

14.8 Residual Effects of the Proposed Development

14.8.1 Construction and Demolition Phase

14.8.1.1 Surface Water

Mitigation measures have been put in place for the protection of surface water. In order to remediate any further impact on the environment, monitoring should be undertaken. A surface water inspection programme should be put in place. These should include daily visual inspections to ensure surface water management measures as set out in the CEMP are effective.

Following implementation of these mitigation measures, residual impacts on surface water are expected to be ***negligible***. The development has been designed to ensure compliance with national standards and long-term sustainability of utility services

14.8.1.2 Service protection

The implementation of the mitigation and monitoring measures detailed in Section 14.6.2 and 14.7.1, will ensure that the potential impacts on underground and overground utilities on construction workers health and safety during the construction phase are adequately mitigated. Procedures are put in place and details in the CEMP and will be planned for in the contractor's work methodologies.

The residual effect on underground and overground utilities on construction workers health and safety during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

14.8.1.3 Traffic

The implementation of the mitigation and monitoring measures detailed in Section 14.6.2 and 14.7.1, will ensure that the potential impacts associated with traffic relating to utilities construction during the construction phase are adequately mitigated.

14.8.1.4 Foul Drainage

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The implementation of the mitigation and monitoring measures detailed in Section 14.6.2 and 14.7.1, will ensure that the potential impacts associated with foul drainage relating to utilities construction during the construction phase are adequately mitigated.

The residual effect on foul drainage relating to utilities construction during the construction phase is considered to be ***neutral, imperceivable*** and ***short-term***.

14.8.1.5 Electricity Supply

The implementation of the mitigation and monitoring measures detailed in Section 14.6.2 and 14.7.1, will ensure that the potential impacts associated with excavation near underground electrical services during the construction phase are adequately mitigated.

The residual effect on excavation near underground electrical services relating to utilities construction during the construction phase is considered to be ***negative, slight*** and ***short-term*** after mitigation has been put in place.

14.8.2 Operational Phase

14.8.2.1 For the protection of surface waters

The implementation of the mitigation and monitoring measures detailed in Section 14.6.3 and 14.7.3, will ensure that the potential impacts on surface water and groundwater quality once the proposed development is constructed and operational are adequately mitigated.

The residual effect on surface water quality during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term.***

14.8.2.2 Process water discharge

The implementation of the mitigation and monitoring measures detailed in Section 14.6.3 and 14.7.3, will ensure that the potential impacts on process water discharge once the proposed development is constructed and operational are adequately mitigated.

The residual effect on process water discharge during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term.***

14.8.2.3 Foul Drainage

The implementation of the mitigation and monitoring measures detailed in Section 14.6.3 and 14.7.3, will ensure that the potential impacts on foul drainage once the proposed development is constructed and operational are adequately mitigated. Foul draining from the village enter will remain connected to the EU foul mains. A discharge licence will be required. Monitoring and mitigation and maintenance measures will be associated with this licence.

The residual effect on process water discharge during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term.***

14.8.2.4 Power and Electrical Supply

The implementation of the mitigation and monitoring measures detailed in Section 14.6.3 and 14.7.3, will ensure that the potential impacts on electrical demand, for the proposed development is constructed and operational are adequately mitigated. Electrical demand associated the village centre will be met with a

surplus. Backup generators are in place should there be a failure to the connection. An additional planning proposal for an offshore wind farm with connections to this site will subsidise this grid demand further.

The residual effect on electrical demand during the operational phase is considered to be ***neutral, slight*** and ***long-term.***

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14.8.3 Decommissioning Phase

There will be a short-term impact associated with the decommissioning phase of development. Due to the high level of excavation during the decommissioning phase.

A demolition management plan will be put in pace during this phase. Mitigation measures will be addressed for the decommissioning phase. The residual impact is anticipated to be ***short term, neutral*** and ***imperceptible***.

14.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below. Full details on the cumulative developments considered are set out in Appendix 2.1 of this EIAR.

Existing developments that are already constructed and operational form part of the baseline environmental conditions. Therefore, any additional environmental impacts arising from the proposed development—when considered alongside these existing developments—have been assessed in the earlier sections of this chapter.

14.9.1 Demolition and Construction Phase

During the demolition and construction phase of the proposed development, there may be a potential cross over in construction phase particularly associated with planning reference 2460616 and 2360179. These developments are housing estates. Although there is potential for cross over, this should not have an impact on times scales or associated work on this proposed development.

As seen above, there are a number of developments however these developments are small scale and will have no impact on the proposed development construction phase.

14.9.2 Operational Phase

During the operational phase of the proposed development, there may be a potential cross over in construction phase particularly associated with planning reference 2460616 and 2360179 there is potential for cross over in completion dates. This should not have an impact on times scales or associated work on this proposed development.

As seen above, there are a number of developments however these developments are small scale and will have no impact on the proposed development operational phase with respect to the impact associated with utilities.

14.10 References

- Department of Housing, Planning & Local Government (DHPLG) (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
- Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Environmental Protection Agency (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)

- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report
- Met Éireann (2024) Met Éireann website: https://www.met.ie/

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Chapter 15 – Material Assets – Waste Management

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15. MATERIAL ASSETS – WASTE MANAGEMENT

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15.1 Introduction

This chapter evaluates the likely significant effects, if any, which the proposed development may have on Waste management as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU), the EPA EIA Report Guidelines 2022 and EPA Draft Advice Notes for EIS 2015.

This waste chapter has been prepared to address the issues associated with waste management during the construction and operational phases of the proposed development as described in Chapter 2 (Description of the Proposed Development). It has been produced in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2014)[1], the EPA Guidelines on the Information to be contained in EIAR (2022)[2] and the EU Commission Notice on changes and extensions to projects, (2021)[3]. This chapter is also produced in accordance with The Southern Region Waste Management Plan 2015 – 2021[4], Construction and Demolition (C&D) Waste: Soil and Stone Recovery/Disposal Capacity, Update Report (2020)[5], the National Waste Action Plan for a Circular Economy 2024 – 2030[6], Guidance on Soil and Stone By-Products (2019)[7], A Resource Opportunity – Waste Management Policy in Ireland (2012)[8] and Waterford County Development Plan 2022-2028[9].

A site-specific Resource Waste Management Plan (RWMP) has been prepared by Coyle Environmental Ltd to deal with waste generation during the excavation and construction phases of the proposed development and has been included as Appendix 15.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (2021) and Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government (DoEHLG) (2006).

These documents will ensure the management of wastes arising at the development site in accordance with legislative requirements and best practice standards.

15.2 Methodology

The assessment of the impacts of the proposed development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, including an extensive document review to assist in identifying current and future requirements for waste management, including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the proposed development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

- Legislative context.
- Construction phase (including site excavations); and
- Operational phase.

[1] Environmental Impact Assessment - European Commission
[2] Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)
[3] Environmental Impact Assessment - European Commission
[4] Southern Waste Region
[5] Report
[6] National-Waste-Management-Plan-for-a-Circular-Economy-Volume-I-Current-Situation-and-Challenges.pdf
[7] Guidance on Soil and Stone By-products
[8] A Resource Opportunity | Environmental Protection Agency
[9] Waterford City & County Development Plan 2022–2028 - Waterford City & County Council

A desktop study was carried out which included the following:

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- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland. These include:
  - Waste Framework Directive (2008/98/EC)
  - Waste Management Act 1996 (as amended)
  - Southern Regional Waste Management Plan 2015 – 2021
  - Construction and Demolition (C&D) Waste: Soil and Stone Recovery/Disposal Capacity, Update Report (2020)
  - Waste Action Plan for a Circular Economy 2020 – 2025
  - Guidance on Soil and Stone By-Products (2019)
  - National Waste Management Plan for a Circular Economy 2024 - 2030
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been estimated and are included in Section 15.5.1 of this chapter. These figures are indicative only. The waste types and estimated quantities are based on data recorded from similar previous developments.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 15.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapters 5 (Land, Soils and Geology) and 6 (Hydrology and Hydrogeology) of this EIAR.

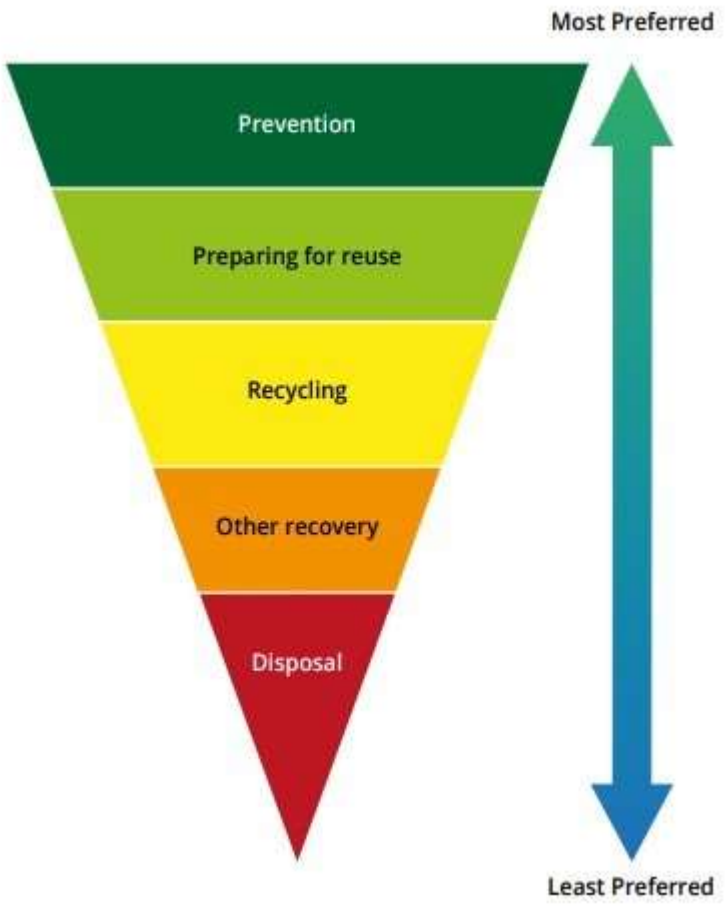
15.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

European and national waste management policy is based on the concept of 'waste hierarchy,' which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 15.1).

Figure 15.1 Waste Hierarchy (EPA)

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EU and Irish National waste policy also aims to contribute to the Circular Economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products (Figure 15.2).

Figure 15.2 The Circular Economy (EU Parliament Research Service)

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The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, A Waste Action Plan for a Circular Economy (WAPCE) – Ireland's National Waste Policy 2020-2025, which shifts focus away from waste disposal and moves it back up the production chain. The National Waste Management Plan for a Circular Economy 2024 – 2030 focuses on two principal pillars low carbon growth and resource efficiency. Ireland is moving beyond target compliance and carbon mitigation to integrating sustainable solutions to transition to a low carbon circular economy.

The Circular Economy and Miscellaneous Provisions Act 2022 was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will work to significantly reduce our greenhouse gas emissions. The Act defines CE for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). The guidance documents, Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects and Construction and

Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no national guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the Southern Region Waste Management Plan 2015-2021 & Associated Reports, Waterford City and County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws, 2018, EPA National Waste Database Reports 1998 – 2020 and the EPA National Waste Statistics Web Resource.

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15.2.2 Terminology

Note that the terminology used herein is consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

1. the quantity of waste, including through the re-use of products or the extension of the life span of products;
2. the adverse impacts of the generated waste on the environment and human health; or
3. the content of harmful substances in materials and products.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Waste - Any substance or object which the holder discards or intends or is required to discard.

15.2.3 Forecasting Methods and Difficulties Encountered

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

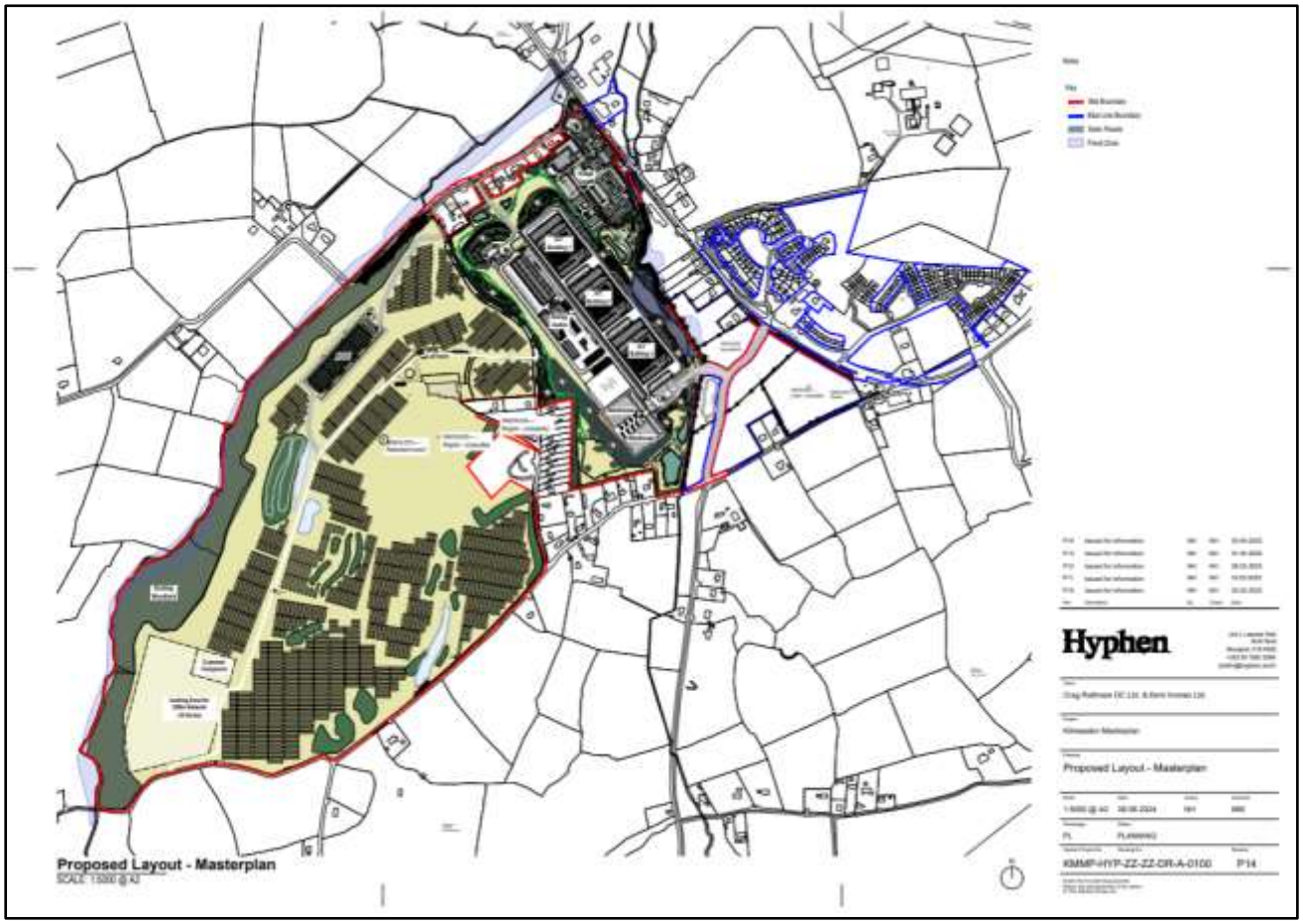
There are a number of licensed, permitted and registered waste facilities in Waterford and Southern Regions and across Ireland. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition,

there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability. The waste facilities selected will ultimately be selected to minimise the environmental impacts on the surrounding environment.

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Figure 15.3 Proposed Layout – Masterplan - KMMP-HYP-ZZ-DR-A-0100



15.3 Receiving Environment

In terms of waste management, the receiving environment is largely defined by Waterford County Council as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Southern Region Waste Management Plan 2015 - 2021 and the Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland. The waste management plans set out the following targets for waste management in the region:

- Achieve a recycling rate of 55% of managed municipal waste by 2025, 60% from 2030 and 65% from 2035.
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in November 2021 identifies that Ireland's current "Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)" was met for 2020 at 51% however they are currently not in line with the 2025 target (55%).

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The Waterford County Development Plan 2022- 2028 set out the policies and objectives for the Waterford area which reflect those set out in the regional management plan.

In terms of physical waste infrastructure, there are a number of wastes permitted and licensed facilities located in the region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, municipal waste landfills, material recovery facilities and waste transfer stations.

Table 15.1 Licensed Waste Facilities[10]

Landfill Facility Name	Permit Number
Friends of the Earth Ltd- Co. Waterford	WFP-WCCC-18-0006-02
Halfway House - Co. Waterford	WFP-WCCC-19-0004-02
Ardinagh Construction and Waste Ltd - Co. Wexford	WFP-WX-20-0012-03
C&D Recycling Kavanagh Ltd – Co. Wexford	WFP-WX-20-0099-02

Table 15.2 Licensed Waste Transfer Stations that could potentially accept C&D waste[11]

Waste Transfer Station Name	Licence Number
Starrus Eco Holdings Limited (now Greenstar) – Butlerstown Depot – Co. Waterford	W0116
Dungarvan Waste Disposal Site – Co. Waterford	W0032
Bord Na Móna Recycling Limited – Co. Wexford	W0229
Murray Waste Recycling Limited – Co. Wexford	W0258

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

15.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

[10] National Waste Collection Permit Office Home

[11] Environmental Protection Agency

15.4.1 Demolition Phase

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Some demolition is required within the former factory site comprising 24,100sq.m (approx.) assuming 0.5m deep across the area gives 12,050cu.m waste. Assuming 2.3t/cu.m (some is concrete some is asphalt) this will result in approx. 27,715t of waste for disposal, before construction works can begin. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development.

15.4.2 Construction Phase

During the construction stage the main source of air quality effects will be as a result of fugitive dust emissions from site activities. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site.

Some demolition is required within the former factory site comprising 24,100sq.m (approx.) assuming 0.5m deep across the area gives 12,050cu.m waste. Assuming 2.3t/cu.m (some is concrete some is asphalt) this will result in approx. 27,715t of waste for disposal. During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be soil, stones, made ground and clay excavated to facilitate construction of new foundations, basement and the installation of underground services. The development engineers (Atkins Realis Ireland Limited) have estimated that c. 268,148.477m^3 of material will need to be excavated to do so. This material will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

If any material removed from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended.

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria).

This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Any surplus excavated material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented below in Table 15.3. The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the proposed development.

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Table 15.3 Cut and Fill Volumes[12]

Surface	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Demolition	24100.000	0.000	24100.000
Site Cut & Fill	214811.570	87918.951	126892.619
Ponds Volume	23048.792	1.840	23046.954
Infiltration trenches Solar Farm	6188.113	0.000	6188.113
Total	**268148.477**	**87920.791**	**180227.686**

15.4.3 Operational Phase

Once operational, it is anticipated that very small amount of waste will be generated at the proposed development by staff during their inspections and maintenance works at the data centre and solar farm. However, the village centre comprises a mixed-use development which includes a medical centre, café, gym, community centre, crèche, supermarket, small scale commercial units and retired living / residential use with associated open space, roads, footpaths and car parking. This will generate a significant amount of waste by staff and residents of the village centre on a day-to-day basis.

These wastes may include organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently. Waste generated at the proposed development will be managed in line with the waste management strategy for the wider development site.

It is proposed to provide separate foul networks for the Technology Park and the Village Centre, to enable monitoring of the wastewater discharge from the Data Centres and Energy Centres separately from the domestic wastewater discharge from the Village Centre. For the Technology Park, it is proposed to provide a 300mm foul water pipe network along the perimeter of the Energy Centre and the Data Centres and tie in with the existing foul network running to the north of the site. A new manhole is proposed for this connection and the existing foul sewer line is proposed to be upsized to 300mm and reconstructed up to the main road.

The cooling system within the data halls will be a closed loop water circulatory system with roof chillers forming the primary cooling solution. Closed loop water cooling systems reuses the cooling water, which minimises water usage.

All foul water generated on the proposed development will be sent to Ballyduff Lower-Kilmeaden Waste Water Treatment Plant (WWTP) (Reg: A0370), located c. 620m north-east of the site along the Lacka Road. A Pre-Connection enquiry application was submitted to Uisce Éireann in December 2024 for the wastewater discharge of the proposed development (Ref: DIV24393).

[12] Kilmeaden, Chapter 6 Hydrology and Hydrogeology

15.4.4 Decommissioning Phase

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It is intended that the proposed development will have a long lifespan. Regular maintenance and upgrading of the facilities over time will enable it to continue to meet future demands. Any changes in the future which require planning approval will incur associated environmental impact assessment and mitigation.

Upon closure of the Technology Park, it is anticipated that the facility will be suitable for re-use or sold to a third party as would any other industrial site. All plant and equipment would simply be decommissioned, removed and recycled/disposed as appropriate. The costs associated with the closure of the facility will be met by the Applicant. Closure of the licenced facility would be undertaken in accordance with the EPA licence for the facility.

The Kilmeaden Solar Farm is expected to operate for a period of 30 years. At the end of this operational life, the applicant will carry out decommissioning works which will include the complete removal of all solar infrastructure, including photovoltaic modules, mounting structures, electrical equipment and all associated components. This includes the removal of any subsurface cables and concrete footings to a depth of one metre.

All access roads or temporary laydown areas created during the construction or operation of the system will also be removed, unless otherwise requested by the landowner or required for ongoing agricultural use. These areas will be re-vegetated with appropriate native grassland species or similar vegetation, suitable for the reinstated land use.

All solar panels and associated equipment removed from the project site, unless being reused, repurposed or upgraded as part of a phased repowering strategy, will be recycled or disposed of in accordance with applicable EU and national waste management policies in effect at the time of decommissioning. Materials such as aluminium, glass, copper and silicon from the PV modules will be directed to certified recycling facilities.

The process will also include restoration of the land to its original condition before installation. This includes grading, reapplication of topsoil where needed and vegetative stabilisation. The aim is to ensure the land is returned to a condition suitable for agricultural or previous land uses, with no lasting environmental or physical impact.

15.5 Potential Impacts of the Proposed Development

This section details the potential waste effects associated with the proposed development.

The potential for impacts from this proposed development will depend on a range of factors, including the type of proposed activity, prevailing environmental conditions, and proximity to sensitive receptors. There are potential short-term nuisances associated with the proposed development activities, such as dust, pollution of groundwater or existing drainage, litter and waste materials. These nuisances can cause disruptions to nearby areas and may be a source of concern for sensitive receptors.

Some activities, such as excavation may have a greater potential for causing impacts than others. The potential for impacts will depend on prevailing environmental conditions, such as the amount of rainfall, wind speeds, and wind direction. For example, high winds can increase the amount of dust and debris that is generated during construction, potentially impacting nearby areas. Another important factor considered is the proximity of sensitive receptors to the proposed development. Sensitive receptors can include nearby residences, schools, hospitals, or other areas where people may be affected by the proposed development. The closer these receptors are to the proposed development, the greater the potential for impacts.

15.5.1 Waste Types and Volumes

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Table 15.4 Estimated Construction and Excavation Waste and End Destination of an Energy Centre[13]

Waste Type	Estimated Quantities	Reuse		Recycle/Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	775	0	0	90	697	10	78
Timber	658	0	0	90	592	10	66
Plasterboard	235	0	0	90	211	10	24
Metals	188	0	0	100	188	0	0
Concrete	141	100	141	0	0	0	0
Other (including cabling, ducting, conduits, packaging and plastic	352	0	0	80	282	20	70
Topsoil	24,645	100	24,645	0	0	0	0
Excavated materials	17,830	100	17,830	0	0	0	0
Total	**44,472**	**-**	**42,616**	**-**	**1,970**	**-**	**238**

Table 15.5 Estimated Demolition Waste and End Destination of an Energy Centre

Waste Type	Estimated Quantities	Reuse		Recycle/Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Glass	12	0	0	85	11	15	2
Concrete, bricks, tiles, ceramics	71	95	67	0	0	5	4
Plasterboard	6	0	0	85	5	15	1
Asphalts	114	0	0	95	108	5	6
Metals	21	0	0	95	20	5	1
Slate	11	0	0	85	9	15	2
Timber	17	0	0	90	15	10	2
Total	**251**	**-**	**67**	**-**	**168**	**-**	**16**

[13] Vantage Dublin Data Centre, Volume 1, Main EIAR, 2022

Table 15.6 Estimated on and off-site reuse, recycle and disposal rates of construction waste for a village centre[14]

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Waste Type	Estimated Quantities	Reuse		Recycle/Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed Construction	14257.98	10	1425.80	80	11406.38	10	1425.80
Timber	12097.68	40	4839.07	55	6653.72	5	604.88
Plasterboard	4320.6	30	1296.18	60	2592.36	10	432.06
Metals	3456.48	5	172.82	90	3110.83	5	172.82
Concrete	2592.36	30	777.71	65	1685.03	5	129.62
Other	6480.9	20	1296.18	60	3888.54	20	1296.18
Total	**43206**		**10080.76**		**30153.47**		**4174.41**

Table 15.7 Residential Waste Prediction (L/per week) for a village centre

Waste Types	Northern Portion	Southern Portion	Total
Organic Waste	345	315	660
Mixed Dry Recyclables	5060	4585	9645
Glass	345	315	660
Mixed Municipal Waste	5060	4585	9654
Total	**10,810**	**9800**	**20,619**

15.5.1.1 Storage of Soils/Aggregates

The employment of good construction management practices and full adherence to the Construction & Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site.

Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

15.5.1.2 Storage of Hazardous Material

Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

[14] McGill Planning, Parkside 4 Residential Development EIAR, 2019

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

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15.5.1.3 Import/Export of Materials

There will be a requirement for deliveries and refuelling of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Refuelling will be completed in accordance with the best standard practice refuelling procedure. To support the construction of proposed roads, car parks, and buildings, additional fill material may need to be imported. 'Just in Time' delivery system will operate to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances. Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil removed will be re-used on site for backfill. Any surplus topsoil, subsoil and bedrock material will be transported off site and disposed of at a fully authorised soil recovery site or licenced landfill based on the waste soil classification.

15.5.2 Demolition Phase

The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by demolition employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

Correct classification and segregation of the demolition material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

15.5.3 Construction Phase

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The proposed development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

There is a quantity of excavated material which will need to be excavated to facilitate the proposed development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 5. It is anticipated that in total, the demolition material and unusable excavated material, 46,838 + 24,100 = 70,938 cu.m, will require removal from the site. Classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

There is pre-existing pipework containing asbestos within the existing watermains on site. The asbestos pipework is to be relocated onsite. If any pipework is damaged and needs to be removed it will be done through a specialist waste contactor and following the Best Practice Guidance for Handling Asbestos[15].

15.5.4 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling can be sent for energy recovery. There are also facilities in the region for segregation of municipal

[15] Best practice guidance for handling asbestos | Environmental Protection Agency

recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

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If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

Waste contractors will be required to service the proposed development on a scheduled basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

15.5.5 Decommissioning Phase

The potential impacts on the environment of improper, or a lack of, waste management during the decommissioning phase of the Technology Park would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

The nature of the development means the generation of waste materials during the decommissioning phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling can be sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and disposed of correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

15.6 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment. The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

15.6.1 Demolition Phase

In order to manage the demolition activities, implement and monitor the effectiveness of the mitigation measure set out in this EIAR, the site-specific CEMP will be implemented and adhered to by the construction Contractor. The CEMP will also include a site-specific Waste Management Plan, in line with the RWMP included as Appendix 15.1 of this EIAR, which will be reviewed to include any planning conditions that are imposed and updated by the Project Manager, Environmental Manager, Resource

Manager and Environmental Clerk of Works where relevant and as required if site conditions or construction methods change.

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15.6.2 Construction Phase

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the EPA, Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 15.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

The following mitigation measures would be implemented during the operation stage of the proposed development:

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 15.1) in agreement with Waterford County Council and in compliance with any planning conditions, or submit an addendum to the RWMP to Waterford County Council, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases. A quantity of soil, stones, made ground and clay will need to be excavated to facilitate the proposed development. The project engineers have estimated that in total, the demolition material and unusable excavated material, 46,838 + 24,100 = 70,938 cu.m, will require removal from the site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. In addition, the following mitigation measures will be implemented:
- Building materials will be chosen to 'design out waste;'
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
  - Concrete rubble (including ceramics, tiles and bricks);
  - Plasterboard;
  - Metals;
  - Glass;
  - Timber; and
  - Packaging.
- Surplus materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal);
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and

not as a waste), this will be done in accordance with Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended.

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These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the EMR Waste Management Plan 2015 – 2021. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

15.6.2.1 Cement/Concrete Works

- No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within ten meters of an existing surface water drainage point.
- Wash-outs will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer subject to agreement with Uisce Éireann / WCC.
- The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Relevant personnel working on the site will be suitably trained in the implementation of the procedures.

15.6.2.2 Wastewater Management

- Foul wastewater arising from the site will be managed and controlled for the duration of the construction works.
- Foul water from the offices and welfare facilities on the site will be collected in portable sanitary facilities and disposed of appropriately by licenced contractor.
- The main construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.
- The connections to Uisce Eireann infrastructure for wastewater and water will be subject to an agreement with Uisce Eireann. A Pre-connection enquiry (CDS24011093) was submitted in December 2024.

Table 15.8 Water Demand for Domestic and Industrial usage[16]

Description	Population		Domestic		Industrial	
		Demand (l/p/d	Daily Average Demand	Daily Peak Demand (l/s)	Average Demand (l/s)	Peak Demand (l/s)
Village Centre						
Apartment Blocks A & B	192	150	0.333	2.083		
Future Expansion	405	150	0.703	4.395		
Creche	249	90	0.259	1.621		
Supermarket	264	100	0.306	1.910		
Community Centre	287	60	0.199	1.246		
Multiuse Building	318	50	0.184	1.150		
Warehouses/Offices	144	100	0.167	1.042		

[16] Kilmeaden Masterplan, Civil Engineering Report, 2025

Description	Population		Domestic		Industrial	
Commercial Unit	91	50	0.053	0.329		
Technology Park						
Warehouses/Offices	430	100	0.498	3.111		
Energy Centre	50	50	0.029	0.181	0	0
Data Centre 1	50	50	0.029	0.181	1.322	3.062
Data Centre 2	50	50	0.029	0.181	1.322	3.062
Data Centre 3	50	50	0.029	0.181	1.322	3.062

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Table 15.9 Wastewater Discharge for the overall development

Description	Domestic		Industrial	
	Daily Average Demand	Daily Peak Demand (l/s)	Average Demand (l/s)	Peak Demand (l/s)
Village Centre				
Apartment Blocks A & B	0.367	2.200		
Future Expansion	0.773	4.641		
Creche	0.285	1.712		
Supermarket	0.336	2.017		
Community Centre	0.219	1.315		
Multiuse Building	0.202	1.215		
Warehouses/Offices	0.183	1.100		
Commercial Unit	0.058	0.348		
Technology Park				
Warehouses/Offices	0.547	3.285	0	0
Energy Centre	0.032	0.191	0	0
Data Centre 1	0.032	0.191	1.190	2.756
Data Centre 2	0.032	0.191	1.190	2.756
Data Centre 3	0.032	0.191	1.190	2.756

15.6.2.3 Surface Water and Groundwater Flow and Quality

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the surface water drainage system of the proposed development is complete.

A site specific CEMP will be prepared for approval of the IFI and Local authority prior to commencement of construction works.

The method statement will include best practice measures as outlined in the "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) and "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)".

15.6.3 Operational Phase

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All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the Southern Region Waste Management Plan 2015 – 2021, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland and the Waterford County Council waste bye-laws.

All waste generated at the proposed development will be managed in line with the waste management strategy for the wider development site, which comprises ICT Facility Buildings, infrastructure, roads and landscaping.

The operator of the development during the operational phase will be responsible for allocating personnel and resources, as needed. This is to ensure a high level of recycling, reuse and recovery at the site of the proposed development.

The operator will regularly audit the onsite waste storage facilities and infrastructure and maintain a full record of all documentation of waste removal from the site.

The following mitigation measures will be implemented;

- The operator will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Cardboard;
  - Plastic;
  - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
  - Cleaning chemicals (paints, adhesives, resins, detergents, etc.).
- The operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The operator will ensure that all waste collected from the site of the proposed development will be reused, recycled, or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The operator will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.

These mitigation measures will ensure the waste arising from the Proposed Development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996 as amended, associated regulations, the Litter Pollution Act 1997, the SR Waste Management Plan 2015 – 2021 and the WCC Waste Bye-Laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

15.6.3.1 Surface Water and Groundwater Flow and Quantity

The proposed incorporation of hardstand area and the use of SUDs design measures will have a minor effect on local recharge to ground and has the potential to result in increased run-off from the site if not adequately mitigated.

The proposed incorporation of hardstand areas and the implementation of Sustainable Urban Drainage Systems (SuDS) design measures will have a minor effect on local groundwater recharge and may lead to increased runoff from the site if not properly managed.

To mitigate the risk, the design of the development and its drainage infrastructure will ensure that runoff rates are restricted to those of greenfield conditions. The development will incorporate SuDS and an attenuation system, with a design that includes a 20% allowance for climate change. The proposed surface water management strategy aims to prevent surcharging during a 1 in 5-year storm event, eliminate flooding during a 1 in 30-year storm event, and either prevent flooding or control flooding during a 1 in 100-year storm event, thereby containing runoff on-site and protecting surrounding infrastructure.

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15.6.4 Decommissioning Phase

The Decommissioning Plan for Kilmeaden Solar Farm sets out a comprehensive and realistic framework for the safe, controlled and environmentally responsible removal of the Kilmeaden Solar Farm infrastructure at the end of its operational life.

The decommissioning of the Data centres must set out a safe, controlled and environmentally responsible removal of waste heat recovery systems including the waste heat plate heat exchanger. The waste heat plate heat exchanger within each ICT facility shall remove heat from the facility side chilled water system before it is exhausted to the atmosphere. This waste heat will be distributed to the village centre through a hydraulic flow and return piped water distribution system.

As part of the IED licence application which will be prepared for the Technology park, an outline Closure Plan will be submitted outlining how the site will be decommissioned in accordance with EPA requirements.

15.7 Monitoring or Reinstatement Measures

The management of waste during the construction phase will be monitored by the Contactor's appointed Resource Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the operator to ensure effective implementation of the mitigation measures outlined in Section 15.8, and internally and by the nominated waste contractor(s).

15.7.1 Demolition Phase

Site preparation will require demolition within the former factory site comprising 24,100sq.m (approx.) to level the site to facilitate the construction of the proposed development. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

Any surplus excavated material that requires removal from site for offsite reuse, recovery and/or disposal and any potentially contaminated material (in the unlikely event that it is encountered), will be segregated, re-tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application.

Monitoring requirements for the development will be stipulated in the CRWMP. This will include the requirement for recording all waste materials leaving the site and maintenance of contractor waste collection permits and facility permits/licences on site.

15.7.2 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The RWMP specifies the need for a

Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the proposed development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future developments.

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During construction phase the following monitoring measures will be considered:

- Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping.
- Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt control measures during construction phase is crucial to ensuring that they work as intended.
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).

15.7.3 Operational Phase

During the operational phase, waste generation volumes should be monitored by the Operator. There may be opportunities to reduce the number of bins and equipment required in the on-site, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs.

Hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

15.7.4 Decommissioning Phase

The Decommissioning Plan for Kilmeaden Solar Farm sets out a comprehensive and realistic framework for the safe, controlled and environmentally responsible reinstatement of the Kilmeaden Solar Farm site at the end of its operational life.

The decommissioning of the Data and Village centres must set out a safe, controlled and environmentally responsible reinstatement of the Data and Village centre sites at the end of their operational lives in agreement with the local authority.

Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

Any surplus excavated material that requires removal from site for offsite reuse, recovery and/or disposal and any potentially contaminated material (in the unlikely event that it is encountered), will be segregated, re-tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application.

Monitoring requirements for the development will be stipulated in the CRWMP. This will include the requirement for recording of all waste materials leaving the site and maintenance of contractor waste collection permits and facility permits/licences on site.

15.8 Residual Effects of the Proposed Development

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The implementation of the mitigation measures outlined in Section 15.6 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the proposed development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

15.8.1 Demolition Phase

There will be a short-term impact associated with the demolition phase of development. Due to the high level of recycling that will be achieved during the demolition phase through the implementation of the CRWMP. To achieve optimum levels of waste reduction, re-use and recycling, demolition is also undertaken in accordance with the Southern Region Waste Management Plan 2015 - 2021. The residual impact is anticipated to be ***short term, neutral*** and ***imperceptible.***

15.8.2 Construction Phase

A carefully planned approach to waste management as set out in Section 15.6 and adherence to the RWMP (which includes mitigation) during the construction phase will ensure that the predicted effect on the environment will be ***short-term, imperceptible*** and ***neutral.***

15.8.3 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 15.8 will promote resource efficiency waste prevention and waste minimisation. Waste will be managed in accordance with the current legal and industry standards including the *Waste Management Act 1996* as amended, *Litter Pollution Act 1997* as amended and the *National Waste Management Plan for a Circular Economy 2024-2030*. When the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, imperceptible*** and ***neutral.***

15.8.4 Decommissioning Phase

There will be a short-term impact associated with the decommissioning phase of the development. Due to the high level of recycling that will be achieved during the decommissioning phase in accordance with the EPA licence for the facility.

To achieve optimum levels of waste reduction, re-use and recycling, demolition is also undertaken in accordance with the Southern Region Waste Management Plan 2015 - 2021. The residual impact is anticipated to be ***short term, neutral*** and ***imperceptible.***

15.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered see Chapter 2, Section 2.3.1 with the full listing in Appendix 2.1

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

Any future application on these lands will be subject to planning approval and environmental assessment as required. Any new development proposed on the lands after the submission of the proposed

development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

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15.9.1 Demolition Phase

The potential cumulative impact on waste during the demolition phase are as follows:

- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.
- Contamination of surface water and groundwater from accidental spillage and leakage from demolition traffic and demolition materials is possible unless project-specific measures are put in place for each development and complied with.

All work contractors for planned or permitted developments within 1km of the proposed development are obliged to have mitigation measures in place to prevent waste from occurring and dealing with waste in line with legislation standards.

The two large-scale housing developments granted planning (planning refs - 2460616 and 21214) in the surrounding area are likely to proceed with construction before this proposed development. The remaining granted planning applications are domestic small scale and are not anticipated to have any cumulative impacts when considered with the proposed development.

15.9.2 Construction Phase

In relation to the potential cumulative impact on waste during the construction phase, the construction works which would have potential cumulative impacts are as follows:

- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.
- Contamination of surface water and groundwater from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to prevent waste from occurring and dealing with waste on site in compliance with legislative standards for Waste Management (Ireland's National Waste Policy 2020-2025, Best Practice Guidelines for the preparation of resource & waste management plans for construction and demolition projects and Waste management in buildings – code of practice).

The two large-scale housing developments granted planning (planning refs - 2460616 and 21214) in the surrounding area are likely to proceed with construction before this proposed development. The remaining granted planning applications are domestic small scale and are not anticipated to have any cumulative impacts when considered with the proposed development.

As such the effect will be ***short-term, imperceptible*** and ***neutral.***

15.9.3 Operational Phase

In relation to the potential cumulative impact on waste during the operational phase, the operational activities which would have potential cumulative impacts are as follows:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the site. Cumulatively this development and others in the area will result in localised reduced recharge to ground and increase in surface run-off.
- Increased risk of accidental discharge of hydrocarbons from car parking areas, and along roads is possible unless diverted to surface water system with petrol interceptor.

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The implementation of SuDs measures on site will mitigate against and reduce the recharge rate to ground.

The implementation of mitigation and monitoring measures previously detailed above in section 15.8.2 as well as the compliance of other developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the environment during the operational phase of the proposed development.

Other developments in the area, and the indicative future masterplan development, will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management.

The two large-scale housing developments granted planning (planning refs - 2460616 and 21214) in the surrounding area are likely to proceed with construction before this proposed development. The remaining granted planning applications are domestic small scale and are not anticipated to have any cumulative impacts when considered with the proposed development.

As such the effect will be a ***long-term, imperceptible*** and ***neutral.***

15.9.4 Decommissioning Phase

In relation to the potential cumulative impact on waste during the decommissioning phase, the construction works which would have potential cumulative impacts are as follows:

- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage or to ground.
- Contamination of surface water and groundwater from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to prevent waste from occurring and dealing with waste on site in compliance with legislative standards for Waste Management (Ireland's National Waste Policy 2020-2025, Best Practice Guidelines for the preparation of resource & waste management plans for construction and demolition projects and Waste management in buildings – code of practice).

The two large-scale housing developments granted planning (planning refs - 2460616 and 21214) in the surrounding area are likely to have a longer lifespan than this proposed development. The remaining granted planning applications are domestic small scale and are not anticipated to have any cumulative impacts when considered with the proposed development.

15.10 References

- Waste Management Act 1996 (No. 10 of 1996) as amended.
- BS 5906:2005 Waste Management in Buildings – Code of Practice.
- Department of Communications, Climate Action and Environment (DCCAE), A Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (2020).

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- Department of Environment, Heritage and Local Government (DEHLG) (2006). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.
- Environmental Protection Agency (EPA). National Waste Database Reports 1998-2020.
- EPA (2018). Waste Classification-List of Waste & Determining if Waste is Hazardous or Non-Hazardous.
- EPA and Galway-Mayo Institute of Technology (GMIT) (2015). EPA Research Report 146-A Review of Design and Construction Waste Management Practices in Selected Case Studies-Lessons Learned.
- FÁS and the Construction Industry Federation (CIF) (2002). Construction and Demolition Waste Management-a handbook for Contractors and Site Managers.
- Forum for the Construction Industry-Recycling of Construction and Demolition Waste.
- Litter Pollution Act 19914 (S.I. No. 12 of 19914) as amended.
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended.
- Environmental Protection Agency Act 1992, as amended.
- European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (20114).
- Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022)
- Waterford City and County Development Plan 2022-2028
- Waterford City and County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws, 2018

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Chapter 16 – Interactions

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16. INTERACTIONS

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16.1 Introduction

This chapter of the EIA Report in accordance with the guidance, the potential interactions and inter-relationships between the environmental factors discussed in the preceding chapters. This covers both the construction and operational phase of the Proposed Development.

Directive 2011/92/EU, as amended by Directive 2014/52/EU, and section 171A of the Planning and Development Act, as amended, both provide that an EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the interaction between the following factors:

- human beings, fauna and flora population and human health;
- biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- land, soil, water, air and climate and landscape;
- material assets, cultural heritage and the landscape.

This chapter has been produced following the requirements of the EIA Directive and *Planning and Development Act 2000,* as amended. The contents of the chapter have been prepared following *European Commission 'Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report'* (2017) and the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022).

The quality, magnitude and duration of potential impacts are defined in accordance with the criteria provided in the EPA 2022 Guidance as outlined in Chapter 1 (Introduction). This section of the assessment presents a summary and assessment of the identified interactions.

16.2 Human Health and Populations, and its Interaction with:

16.2.1 Land, Soils and Geology

Construction Phase

A reduction in soil quality via historical or unmitigated pollutants entering the soil has the potential to lead to negative impacts on human health during construction Hydrocarbons and petroleum products for example have a risk for humans by inhaling the fumes / dust from contaminated soil. Depending on the type of contaminant and the level of exposure, soil contamination can have serious health implications. A soil quality risk assessment for suitability for use against commercial development was carried out, and one sample slightly exceeded the Tier 1 criteria for mineral oil. Any potentially contaminated soils encountered will be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method.

Taking into account the design and mitigation measures set out in Chapter 5 of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Land, Soils and Geology during the construction phase. The interaction is considered to be ***negative, not significant*** and ***short term.***

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Land, Soils and Geology during the operational phase.

16.2.2 Hydrology and Hydrogeology

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Construction Phase

The construction phase of the Proposed Development has the potential (without mitigation) to impact on water quality via unmitigated pollutants entering the Whelanbridge River or Whelanbridge Trib 1. As there is no source pathway linkages to any water supplies or bathing/recreational waters there is no potential for a human health impact.

The interaction is considered to be ***neutral, imperceptible*** and ***short-term.***

Operational Phase

Once operational, surface water from the proposed development site will drain to the Whelanbridge Trib 1 via a surface water drainage system incorporating SUDs features and oil interceptors. As there is no source pathway linkages to any water supplies or bathing/recreational waters there is no potential for a human health impact.

The potential for unmitigated off-site flooding as a result of the increased hardstanding areas, and due to the flood risk at the site the Proposed Development has the potential to impact on human health, populations, and material assets located downstream of the site. However, the proposed surface water drainage system features an attenuation system that has been designed for the 1 in 100 year storm event with an allowance of 20% for climate change.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there is no potential for negative interaction Human Health and Populations, and Hydrology during the operational phase. The interaction is considered to be ***neutral, imperceptible*** and ***long term.***

16.2.3 Biodiversity

Construction Phase

There are no potentially significant interactions identified between Human Health and Populations, and Biodiversity during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Biodiversity during the operational phase.

16.2.4 Air Quality and Climate

Construction Phase

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the proposed development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits.

Taking into account the design and mitigation measures set out in Chapter 8 of this EIA Report, there remains a residual negative interaction between Human Health and Populations, and Air Quality and Climate during the construction phase. The interaction is considered to be ***short-term, direct, negative, localised*** and ***not significant.***

Operational Phase

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the proposed development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health.

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Emissions to atmosphere from the proposed technology park (gas turbines and back-up generators) have the potential to impact Air Quality and Human Health. Dispersion modelling of pollutants indicated that concentrations will be in compliance with the ambient air quality standards which are set for the protection of human health.

Taking into account the design and mitigation measures set out in Chapter 8 of this EIA Report, there remains a residual negative interaction between Human Health and Populations, and Air Quality and Climate during the operational phase. The interaction is considered to be ***long-term, localised, direct, negative*** and ***not significant.***

16.2.5 Noise and Vibration

Construction Phase

As detailed in Chapter 10 (Noise and Vibration), there will be some impact on nearby noise sensitive receptors during construction, due to noise emissions from site activity, traffic, and other activities. The application of noise and vibration limits and limits on the hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum.

Taking into account the design and mitigation measures set out in Chapter 10 of this EIA Report, there is potential for negative interaction between Human Health and Populations, and Noise and Vibration during the construction phase. The interaction is considered to be ***direct, short-term, negative*** and ***not significant*** at the nearest sensitive receptors.

Operational Phase

Once the operational noise levels are controlled to the limit values set out in Chapter 10, there are no expected impacts to sleep disturbance from operational noise sources.

The expected health effect due to noise from the proposed development is ***neutral***, ***not significant*** and ***long-term.***

16.2.6 Landscape and Visual Impacts

Construction Phase

The change of use of the site from its current state to that of a construction site has the potential to have a visual impact on the surrounding local population through the introduction of new structures, access roads, machinery, materials storage, associated earthworks, car parking, lighting and hoarding. The existing landscape character will be altered due to changes in ground levels and removal of existing vegetation.

Taking into account the design and mitigation measures set out in Chapter 11 (Landscape and Visual Impact) of this EIA Report, there is potential for negative interaction between Population and Human Health, and Landscape and Visuals during the construction phase. The interaction is considered to be ***negative, moderate,*** and ***short term.***

Operational Phase

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The parts of the proposed development which are designated as public park and public realm will provide high-quality, usable spaces for the local community with a range of uses and functions including walking routes, seating areas, play spaces and fitness areas. The 'Village Centre' proposals will create a high-quality streetscape through part of Kilmeaden Village enhancing visual amenity and provide a range of usable spaces including seating areas and a Multi-Use Games Area. Seating areas, lawns and planted green buffers will enhance the public realm areas around the proposed apartments.

Taking into account these design measures set out in Chapter 11 (Landscape and Visual Impact) of this EIA Report, there is potential for positive interaction between Population and Human Health, and Landscape and Visuals during the operational phase. The interaction is considered to be ***positive, moderate,*** and ***long term.***

16.2.7 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between Human Health and Populations, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.2.8 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

Construction phase impacts to human health as a result of waste are primarily associated the indirect effect of litter issues resulting in increase in vermin. Mismanagement of demolition and soil material can potentially lead to air / dust impacts. There are also potential risks to human health associated with accidents when handling and transporting earthworks and wastes.

During construction, there will be temporary local disruption to pedestrian, cyclists, and vehicular traffic users along the Amberhill Road. Vehicle emissions from increases in traffic have the potentially to interact negatively with human health.

The Proposed Development will have an impact on material assets such as water supply, power supply and road infrastructure. The individual chapters of this EIA Report Chapters 13, 14, and 15 (Traffic and Transportation; Utilities; and Waste Management) have assessed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 13, 14, and 15 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the construction phase. The interaction is considered to be ***negative, slight,*** and ***short-term.***

Operational Phase

Similar risks to those described above for the construction phase associated with improper waste management during the operational phase could lead to litter and associated vermin. There is the potential

risks when untrained staff and waste contractors use waste equipment or move waste receptacles improperly.

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During operation residents, employees, customers and other visitors to the Proposed Development will generate additionally traffic in the local area. Vehicle emissions from increases in traffic have the potentially to interact negatively with human health.

The Proposed Development will have a demand on material assets such as surface water drainage, water supply, wastewater drainage, power supply and road infrastructure. Chapters 13, 14, and 15 (Traffic and Transportation; Utilities; and Waste Management) have reviewed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 13, 14, and 15 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the operational phase. The interaction is considered to be ***negative, imperceptible*** and ***long term.***

16.3 Land, Soils and Geology, and its Interaction with:

16.3.1 Hydrology and Hydrogeology

Construction Phase

The construction phase of the proposed development has the potential for contaminated run-off from accidental leakages, Increased sediment runoff and discharges to ground which has the potential to result in a local impact on soil quality, which could then migrate to the groundwater underlying the site and eventually enter the surrounding hydrological environment. The proposed construction phase mitigation outlined in Section 6.10 - Chapter 6 – Hydrology and Hydrogeology of the EIA, means that the proposed development will not result in significant negative impact on groundwater and surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapter 5 of this EIA Report, there is potential for neutral interaction between Land, Soils and Geology, and Hydrology and Hydrogeology during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term.***

Operational Phase

During operation the majority of the site will be capped by hardstand/building and a drainage system will be installed which features SUDs design measures. Therefore, there is no potential for accidental discharges to ground to contaminate the local soils and underlying aquifer. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term.***

16.3.2 Biodiversity

Construction Phase

In the absence of mitigation, there is potential for silt laden material or pollution to enter nearby surface waterbodies (and impact on local biodiversity and European sites downstream from the works). Furthermore, dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures set out in Chapters 5 and 7 of this EIA Report, there is potential for neutral interaction between Land, Soil and Geology, and Biodiversity during the construction phase. The interaction is considered to be ***neutral, imperceptible*** and ***long term.***

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Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Biodiversity during the operational phase.

16.3.3 Air Quality and Climate

Construction Phase

Construction phase activities such as land clearing, excavations and stockpiling of materials etc. have the potential for interactions between air quality and the land, soils and geological environment in the form of dust emissions. Mitigation measures are proposed to prevent fugitive dust emissions from construction activities including excavation of soils.

Taking into account the design and mitigation measures set out in this EIA Report, there is potential for neutral interaction between Land, Soils and Geology, and Air Quality during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term.***

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Air Quality and Climate during the operational phase.

16.3.4 Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Noise and Vibration during the operational phase.

16.3.5 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Landscape and Visual Impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Landscape and Visual Impacts during the operational phase.

16.3.6 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

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16.3.7 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

During the construction phase, excavated soil, stone and clay will be generated from the excavations required to facilitate site levelling, construction of new foundations and the installations of site services. It is envisaged that some of the excavated material will need to be removed off-site. When material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 5 (Land Soils, and Geology), Chapter 15 (Material Assets – Waste Management), and the requirements of the RWMP (Appendix 15.1), will ensure the effect is ***long-term, imperceptible*** and ***neutral.***

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Material Assets during the operational phase.

16.4 Hydrology and Hydrogeology, and its Interaction with:

16.4.1 Biodiversity

Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from accidental spillages. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may impact on the underlying groundwater quality and downstream water quality and habitats. The design measures and mitigation measures (outlined in Chapters 6 and 7) will be implemented by the construction contractor to ensure that there is no change in the overall water regime at water dependent habitats on and in the vicinity of the site, including the Lower River Suir SAC.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, the interaction between Hydrology and Hydrogeology, and Biodiversity during the construction phase is ***negative, not significant*** and ***short term.***

Operational Phase

Surface water will be discharged offsite to the Whelanbridge Trib 1 located along the sites eastern boundary at greenfield run-off rate. The proposed development surface water drainage system has been designed with SUDs features, and all discharged water will pass through oil interceptors prior to exiting the site. There will be no potential for significant negative impacts to the Lower River Suir SAC via this hydrological pathway from the site.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, there remains a residual interaction between Hydrology and Hydrogeology, and Biodiversity during the operational phase. The interaction is considered to be ***neutral, imperceptible*** and ***long term.***

16.4.2 Air Quality and Climate

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Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from accidental spillages. Suspended solids in run-off water may result in an increase in suspended sediment load, resulting in increased turbidity, which may impact on the underlying groundwater quality and downstream water quality and habitats.

Taking into account the design and mitigation measures set out in this EIA Report, there remains a residual negative interaction between hydrology and hydrogeology, and biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term.***

Operational Phase

Climate change has the potential to increase the risk of flooding in future years due to increased rainfall. The hydrology assessment has concluded that no residual risk is foreseen as the majority of the development is within Flood Zone C and a small portion of the development (earthwork embankments) is constructed in flood zones A & B. The Proposed Development has been assessed as having a low vulnerability to climate change related flooding. The development includes the implementation of SUDS and an attenuation system that has been designed for the 1 in 100 year storm event with an allowance of 20% for climate change.

Therefore it can be determined that there is no significant risk to the Proposed Development or off site as a result of increased rainfall. The interaction is considered to be ***neutral, imperceptible,*** and ***long term.***

16.4.3 Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Noise and Vibration during the operational phase.

16.4.4 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Landscape and Visual Impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Landscape and Visual Impacts during the construction phase.

16.4.5 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

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16.4.6 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Material Assets during the construction phase.

Operational Phase

As a part of the SUDs features, it is anticipated that small amounts of hydrocarbon sludge waste and debris may be generated in the hydrocarbon interceptors which will treat the surface water run-off. This waste stream will be managed in accordance with the relevant legislation identified in Chapter 15 (Material Assets – Waste Management).

All foul water generated on the proposed development will be sent to Ballyduff Lower-Kilmeaden Waste Water Treatment Plant (WWTP) (Reg: A0370). As noted on the Uisce Éireann wastewater capacity register, this plant is noted as having current capacity. Therefore, there is no potential for wastewater discharge from the site to have any significant negative impact on public foul wastewater infrastructure.

Taking into account the design and mitigation measures set out in Chapter 6 (Hydrology), Chapter 14 (Material Assets – Utilities) and Chapter 15 (Material Assets – Waste Management) of this EIA Report, there remains a residual neutral interaction between Hydrology and Hydrogeology, and Material Assets during the operational phase. The interaction is considered to be ***neutral, imperceptible,*** and ***long term.***

16.5 Biodiversity and its Interaction with:

16.5.1 Air Quality and Climate

Construction Phase

Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There are no designated ecological sites within 250 m of the proposed development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Section 8.6.1 of Chapter 8 of the EIAR.

Taking into account the design and mitigation measures set out in Chapter 7 (Biodiversity) and Chapter 8 (Air Quality) of this EIA Report, there remains a residual negative interaction between Biodiversity, and Air Quality during the construction phase. The interaction is considered to be ***direct, negative, localised, not significant,*** and ***short term***.

Operational Phase

During the operational phase there is the potential for air emissions from the proposed technology park (gas turbines and back-up generators) to impact Air Quality, and Biodiversity.

Dispersion modelling of NO_X emissions and nutrient nitrogen and acid deposition at sensitive designated ecological sites in proximity to the proposed development was undertaken. It was determined that

emissions from the proposed development will not cause an exceedance of the critical level for NO_X or the critical load ranges for nitrogen or acid deposition for the identified designated ecological habitats.

Taking into account the design and mitigation measures set out in Chapter 7 (Biodiversity) and Chapter 8 (Air Quality) of this EIA Report, there remains a residual negative interaction between Biodiversity, and Air Quality during the operational phase. The interaction is considered to be ***direct, negative, localised, not significant,*** and ***long term***.

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16.5.2 Noise and Vibration

Construction Phase

Construction will result in noise from plant operating on site. There will be interaction between onsite biodiversity and Noise and Vibration in terms of breeding birds, wintering birds, non-volant mammals and bats due to disturbance. Noise mitigation measures will be implemented on site as set out in Chapter 10 of the EIAR. With the implementation of these mitigation measures noise emissions will be ***short-term, negative*** and ***not significant*** with respect to biodiversity.

Operational Phase

During the operational phase there is the potential for increased noise and vibration from the Proposed technology park and increased human activity around the solar farm and rewilding areas due to the Proposed pedestrian pathway.

Noise from external plant will be minimised as far as practicable through the measures set out in Chapter 10 (Noise and Vibration). Measures to restrict access to the rewilding areas are outlined in Chapter 7 (Biodiversity). Following implementation of these mitigation measures, the interaction is considered to be ***neutral, imperceptible,*** and ***long term***.

16.5.3 Landscape and Visual Impact

Construction Phase

The construction phase site clearance works will result in permanent changes to the landscape with some loss of local biodiversity.

Taking into account the design and mitigation measures set out in Chapter 7 and 11 of this EIAR, the interaction is considered to be ***negative, not significant*** and ***short term.***

Operational Phase

Many of the landscape proposals within the scheme have been implemented to enhance local biodiversity. The landscape scheme includes the retention of a number of boundary hedgerows and tree groups within the site, along with the existing landscape around the proposed solar farm which includes native scrub and grassland. A number of attenuation ponds and wetlands are proposed, along with woodland belts, wildflower meadow, native hedgerow and ornamental shrub and groundcover planting with pollinator-friendly species.

Taking into account the design and mitigation measures set out in Chapter 7 and 11 of this EIAR, which included a landscape plan for the site there remains a residual positive interaction between Biodiversity, and Landscape and Visual during the operational phase. The interaction is considered to be ***positive, moderate*** and ***long term.***

16.5.4 Archaeological, Architectural and Cultural Heritage

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Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.5.5 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

16.6 Air Quality and Climate, and its Interaction with:

16.6.1 Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the operational phase.

16.6.2 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the operational phase.

16.6.3 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Archaeological, Architectural and Cultural Heritage during the operational phase.

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16.6.4 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

During the construction phase, there is the potential for interactions between Climate and Traffic as vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. However, a detailed climate assessment of the construction stage traffic has been scoped out, and there is no potential for a significant negative interaction.

Waste management measures will be put in place during the construction phase to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The impact to climate as a result of embodied carbon in waste materials is not considered significant.

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site.

Taking into account the design and mitigation measures set out in Chapter 8 (Air Quality) and Chapter 13 (Traffic and Transportation) of this EIA Report, there remains a residual negative interaction between Traffic, and Air Quality during the construction phase. The interaction is considered to be ***direct, localised, negative, not significant,*** and ***short term***.

Operational Phase

Road traffic accessing the site during operation will emit air pollutants and greenhouse gases. Dispersion modelling of traffic emissions at sensitive receptors in proximity to impacted road links during the operational phase indicate pollutant emissions will be in compliance with the TII assessment criteria.

Taking into account the design and mitigation measures set out in Chapter 8 (Air Quality) and Chapter 13 (Traffic and Transportation) of this EIA Report, there remains a residual negative interaction between Traffic, and Air Quality during the operational phase. The interaction is considered to be ***direct, localised, negative, not significant,*** and ***long term***.

16.7 Noise and Vibration, and its Interaction with:

16.7.1 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the operational phase.

16.7.2 Archaeological, Architectural and Cultural Heritage

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Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.7.3 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

During the construction phase of the proposed development, construction traffic will use public roads and there will be a corresponding increase in traffic noise levels. In order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25%, it is considered that additional traffic introduced onto the local road network due to the construction phase associated with various phases of the development will not result in a significant noise impact.

Predicted increases in traffic noise levels are such that the resultant noise effects are ***negative, not significant*** and ***short-term.***

Operational Phase

Similarly, during the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site. The predicted change in noise levels due to an increase in road traffic has been calculated in Chapter 10, and are anticipated to be ***negative, not significant*** and ***long-term.***

16.8 Landscape and Visual Impacts, and its Interaction with:

16.8.1 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.8.2 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the operational phase.

16.9 Archaeological, Architectural and Cultural Heritage, and its Interaction with:

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16.9.1 Material Assets, including Utilities, Waste Management and Transport

Construction Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.10 Summary

In summary, the interactions between the environmental factors and impacts discussed in this EIAR have been assessed and the majority of interactions are neutral or negative interactions. Negative interactions are generally associated with the construction phase and will be short term in nature. There are some long term positive interactions associated with the operation of the Proposed Development.

The reasoning behind the conclusion that certain interactions are considered to have a positive, neutral or negative effect is outlined in this Chapter. A summary of the potential interactions is presented in Table 16.1 below

16.11 Table of Interactions

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Table 16.1 Summary of Interrelationships between the Aspects

	Population & Human Health		Land, Soils & Geology		Hydrology & Hydrogeology		Biodiversity		Air Quality & Climate		Noise & Vibration		Landscape & Visual Impact		Archaeological Architectural & Cultural Heritage		Material Assets (including Transport & Waste)	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Population & Human Health			–	X	o	o	X	X	–	–	–	o	–	+	X	X	–	–
Land, Soils & Geology					o	o	o	X	o	X	X	X	X	X	X	X	o	X
Hydrology & Hydrogeology							–	o	–	o	X	X	X	X	X	X	X	o
Biodiversity									–	–	–	o	–	+	X	X	X	X
Air Quality & Climate											X	X	X	X	X	X	–	–
Noise & Vibration													X	X	X	X	–	–
Landscape & Visual Impact															X	X	X	X
Archaeological Architectural and Cultural Heritage																	X	X
Material Assets (including Transport & Waste)																		

Con.	Construction Phase
Op.	Operational Phase
X	No Interaction

+	Positive Interaction
o	Neutral Interaction
–	Negative Interaction